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REMEDIAL ACTION CONTRACT 2
FOR REMEDIAL, ENFORCEMENT OVERSIGHT, AND
NON-TIME CRITICAL REMOVAL ACTIVITIES
IN REGION 5

REVISION 0

TECHNICAL MEMORANDUM
OLD DIE CAST CONTAINMENT CELL EXTRACTION WELL REPLACEMENT
OUTBOARD MARINE PLANT 2 SITE
OPERABLE UNIT #4
WAUKEGAN, ILLINOIS

Prepared for
U.S. Environmental Protection Agency
Region 5
77 West Jackson Boulevard
Chicago, IL 60604

Date Submitted:	July 2020
EPA Region:	5
Work Assignment No:	304-RARA-0528
Contract No:	EP-S5-06-02
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1.0 INTRODUCTION

SulTRAC prepared this Technical Memorandum as part of the remediation activities for the Outboard Marine Corporation (OMC) Plant 2 site in Waukegan, Lake County, Illinois, under U.S. Environmental Protection Agency (EPA) Remedial Action Contract (RAC) 2 for Region 5, Contract No. EP-S5-06-02 Work Assignment (WA) No. 304-RARA-0528.

This technical memo describes the work performed to replace the Old Die Cast (ODC) Containment Cell extraction well (EW), ODC- EW-2, and provides construction details for the replacement extraction well, ODC EW-2R. In addition, ODC-EW-1 was inspected, redeveloped, and treated for biofouling.

2.0 SITE DESCRIPTION AND HISTORY

The OMC Plant 2 site is located at 90 East Sea Horse Drive in Waukegan, Illinois, about 40 miles north of Chicago. The OMC Plant 2 site is the fourth of four operable units (OUs) on the OMC National Priorities List (NPL) site, which also includes the Waukegan Harbor site (OU 1), the Waukegan Manufactured Gas and Coke Plant (Waukegan Coke Plant) site (OU 2), the polychlorinated biphenyl (PCB) Containment Cells (OU-3), and the OMC Plant 2 site (OU-4). Figure 1 shows the location of OMC Plant 2.

EPA prepared an amendment to the Record of Decision (ROD) to describe selected remedial alternatives for the OMC Plant 2 site (EPA 2012). The selected amended remedy consisted of the following components: (1) use of institutional controls (ICs) in the form of a soil management plan, plus deed notices and restrictive covenants; (2) installation of a cap over the ODC area and the north and west utility corridors to cover and contain the contaminants of concern; (3) installation of a vertical barrier wall around the perimeter of the ODC; (4) installation of a groundwater extraction system within the containment cell; and (5) implementation of a long-term monitoring program for groundwater and surface water downgradient of the areas of contaminated soil. EPA then issued scopes of work to SulTRAC to implement the remedial design and remedial action for the ODC containment system and the utility corridor caps.

In 2014, SulTRAC designed and constructed the ODC containment cell to include a soil-bentonite cutoff wall, a Title 35 of the Illinois Administrative Code Part 811 cap, a dewatering system, stormwater management system, and a groundwater monitoring system. The ODC dewatering system included two extraction wells (installed within the containment cell) to extract groundwater from the containment cell and discharge it to the existing on-site treatment system operated by others. The extraction wells were designed to maintain an inward hydraulic gradient within the containment cell and thus operate only when necessary to maintain gradient control. The extraction wells were installed according to the design. Figure 2 shows the location and layout of the ODC containment cell.

The extraction wells are operated intermittently by the site operations staff. The pump at ODC-EW-2 had exhibited low flow rates and mechanical failures due to the excessive buildup of fine sand in the extraction well that clogged the pump. The well ODC-EW-2 was redeveloped in 2016 to remove fine sand from the well. A faulty electric cable to ODC-EW-2 and the transducer at piezometer PZ-7 were replaced in September 2016. The pump and motor at ODC-EW-2 were replaced in 2016, 2017 and 2018,

but failed again. Inspection of the pump and motor shortly after installation in 2018, indicated that a high torque was exhibited by the motor and no water was produced. Tarry sand was observed on the pump intake and the maximum flow the pump could produce was 1.5 gallons per minute (gpm), indicating that the pump had again become clogged with sand. Thus, the extraction well required replacement and redesign to manage the very fine sand of the aquifer and presence of oily materials at this location. Appendix A contains photographic documentation, including a photo of the pump intake at ODC-EW-2 showing the buildup of oily sand. The well was visually inspected with an endoscopic camera in October 2019 and no biological mass was observed on the well screen.

SulTRAC designed the new extraction well and pumping system to reduce the influx of fine-grained sand and silt into the extraction well and to provide a pump suitable for more aggressive environments. The system also included a cooling sleeve for the motor of the submersible pump. The design was completed in March 2019, and the replacement extraction well was installed in October 2019.

ODC-EW-1 had previously exhibited decreasing flow rates. The well was redeveloped by air lifting in 2016. The pump and motor were replaced at ODC-EW-1 in 2016 and 2017. However decreasing flow rates were still exhibited. Therefore, the well was visually inspected with an endoscopic camera in October 2019 and found the well screen was coated in biological mass. The well was redeveloped again in October 2019. After the winter treatment plant hiatus, the well was treated for biofouling in June and July 2020.

3.0 CONSTRUCTION ACTIVITIES

The ODC-EW-2 extraction well replacement construction activities were performed in October 2019. ODC-EW-1 maintenance activities were performed in October 2019, June 2020, and July 2020.

HEPACO was the selected remediation contractor and Environmental Drilling and Contracting, Inc. (EDAC) drilled the soil boring and installed the replacement well. Pier Electric, LLC provided the electrical conduit and installed the electrical cables. Atlantic Liner Company (ALCO) provided liner repair services. IMEG Corporation performed surveying activities.

The ODC-EW-2 extraction well replacement project included the following steps performed in the sequence listed below:

1. Excavated a work area through the soil cap and cut away drainage net and liners to expose subgrade for driller to install extraction well.
2. Drilled and installed new extraction well.
3. Containerized soil cuttings from well installation.
4. Developed the new extraction well and re-developed extraction well ODC-EW-1 and containerized liquids.
5. Excavated a high-density polyethylene (HDPE) water discharge pipe trench and installed and connected the pitless adapter of the new extraction well to the existing HDPE water discharge pipe.
6. Segregated and containerized spoils from water discharge pipe trench (from below the liner system).
7. Backfilled and compacted HDPE water discharge pipe utility trench.
8. Repaired liner system above excavated area to match existing liner system.
9. Installed electrical and control conduits from existing pull box to new extraction well.
10. Connected submersible well pump and motor to electrical cable.
11. Backfilled and compacted excavated area above repaired liner with clay and topsoil to match existing freeze/thaw protection and vegetation layer.
12. Surveyed locations and elevations of replacements for record drawings.
13. Seeded excavation and disturbed areas.
14. Loaded, transported and disposed of spoils and auger cuttings off site as Toxic Substances Control Act (TSCA) PCB-contaminated soil at Wayne Disposal, Inc's facility. in Belleville, Michigan.
15. Disposed of liquids generated from extraction well development at Veolia ES Technical Solutions facility in Port Arthur, Texas.

The ODC-EW-1 maintenance activities included the following:

1. Inspected ODC-EW-1 well screen for evidence of biofouling, using an endoscopic camera
2. Redeveloped ODC-EW-1
3. Treated ODC-EW-1 for biofouling

The following sections provide details on the work performed. Appendix A contains a photolog of the construction activities.

3.1 SITE PREPARATION FOR ODC-EW-2R INSTALLATION

On October 7, 2019, HEPACO mobilized to the site. On October 8, they excavated a small work area through the soil cap for installation of the replacement extraction well. The location was adjacent to the original extraction well ODC-EW-2 and the existing pull box. Topsoil was scraped off and stockpiled for reuse. The clay cap was excavated to the top of the existing liner, and the clean clay capping materials were also stockpiled for reuse. An approximate 3- by 10-foot opening was then cut in the liner system to expose the underlying soil to allow drilling of the extraction well to commence in the soil below the liner. The double-sided drainage geocomposite was cut and set aside for later reuse, the 40-mil linear low-density polyethylene (LLDPE) geomembrane, and the geosynthetic clay liner (GCL) pieces were discarded. The native subgrade soil below the liner system was excavated by hand to locate and expose the HDPE water discharge line.

3.2 REPLACEMENT EXTRACTION WELL ODC-EW-2R INSTALLATION

On October 10, 2019, EDAC arrived at the site to drill the soil boring for installation of the replacement extraction well ODC-EW-2R. The drilling rig was a Gus Pech GP-110ATV equipped with 10-1/4-inch inside diameter hollow stem augers. The extraction well was installed to a depth of about 24.7 feet below ground surface (bgs), and the well was constructed with a 15-foot 0.01-inch machine slotted (well screen (depth intervals from 9.7 to 24.7 feet bgs). The extraction well was constructed with 6-inch-diameter polyvinyl chloride (PVC) riser and screen. During installation, the 5-foot well screen section broke near the threaded portion on the end. The 5-foot section was then connected to the 10-foot well screen section on site by solvent welding the 5-foot section to a Schedule 40 PVC coupling to reattach the screen pieces. This field change is not expected to affect well performance.

A 1-inch-diameter, 0.010-inch slotted PVC piezometer was installed adjacent to the 6-inch extraction well within the same borehole at the same depth and with the same screen length as the replacement extraction well. The 1-inch piezometer houses the pressure transducer that provides continuous water level

monitoring for the groundwater extraction system programmable logic controller (PLC). A pitless adapter was installed on the well riser pipe for connection to the HDPE water discharge line.

A sand filter pack (16-30 mesh) was installed in the annular space around the screen, extending to 1 foot above the top of the screen. The 15-foot-long screen was installed to maximize the well intake length. A bentonite seal was installed above the top of the sand filter pack up to about 6 feet bgs. The remainder of the space included the pea gravel backfill for the pitless adapter and HDPE water discharge line, and the Part 811 cap. The extraction well was completed in a flush-mounted manhole installed in a concrete pad.

All soil cuttings from the drilling of the extraction well were containerized in 1-cubic yard plastic totes for off-site disposal.

The replacement extraction well was developed by repeated pumping and then surging to remove fines. Ten well volumes were removed during the development activities. All liquids from the well development were containerized in 55-gallon drums.

HEPACO hand excavated a trench within the exposed area of the cap to connect to the existing HDPE water discharge line. On October 11, 2019, the existing pipe was cut and a new 1.5-inch 90-degree elbow was butt-fused into place to route the pipe toward the new extraction well. HDPE pipe was connected to the pitless adapter of the replacement extraction well with a stainless steel/HDPE transition fitting. The final connection was made using an electro-fused HDPE coupling. A 100-pound per square inch, 2-hour duration pneumatic pressure test was performed on the HDPE water discharge pipe from the well to the on-site treatment building and no leaks were observed.

The HDPE pipe trench was backfilled with quarry pea gravel and compacted. The excavated area was then prepared for liner repair.

The 4-inch submersible pump and shroud assembly was installed in the replacement extraction well. The pump was energized and its operation was observed.

Figure 3 shows the location of the replacement extraction well ODC-EW-2R. Figure 4 shows the extraction well construction details. Appendix B includes product data for the extraction well, pump, and motors.

3.3 LINER REPAIR

On October 16, 2019, representatives of ALCO arrived on site to repair the liner system. The GCL liner was installed and sealed on the edges with granular bentonite. The LLDPE liner was installed and the seams were fused. An LLDPE boot was installed around the extraction well penetration and was thermally sealed to the adjacent liner. A vacuum test was performed to ensure all seams were fused completely. A few seams were fused again and the vacuum test was repeated until no openings were observed. The reserved piece of the geocomposite was replaced back into the excavation, on top of the LLDPE liner. The excavation area was then ready for conduit installation and backfilling.

Appendix B includes product data for the liner materials.

3.4 CONDUIT AND CABLE INSTALLATION

On October 17, 2019, Pier Electric installed the conduits for electrical and control cables from the existing pull box to the replacement extraction well. The electric cable was threaded through the new conduits into the replacement extraction well. The transducer was installed in the new piezometer for the replacement extraction well and connected to the control cable.

Appendix B also includes product data for the electrical conduit.

3.5 FREEZE/THAW LAYER AND TOPSOIL REINSTALLATION

The excavation area was backfilled on top of the liner system with the segregated clean clay freeze/thaw layer spoils. The clay was compacted with a minimum of three passes with a vibratory compactor. The topsoil was then placed over the clean freeze/thaw layer. Additional topsoil was imported to the site as needed to match existing grade. The imported topsoil was laboratory analyzed for the Title 35 of the Illinois Administrative Code (IAC) Part 740 Target Compound List (TCL) analytes prior to import to the site. The TCL results did not exceed the Title 35 of the IAC Part 742, Tiered Approach to Corrective Action Objectives (TACO) Tier 1 remediation objectives. A copy of the topsoil analytical report is provided in Attachment 1.

Erosion control matting was installed over the extraction well replacement excavation area and the area was seeded with Illinois Department of Transportation Class 3 seed mix.

During the October 2019 construction activities, the topsoil of the cap surface became rutted by the construction equipment; thus, these areas were smoothed, and topsoil and grass seed were added as part of site restoration.

3.6 SURVEY

On October 23, 2019, IMEG surveyed the top of casing elevations of the replacement extraction well and its piezometer. In addition, the top of casing elevations for ODC-EW-1 and its piezometer, as well as the control piezometers (PZ-3/PZ-4 and PZ-7/PZ-8) were resurveyed and the new elevations were provided to the on-site treatment plant operators for programming into the PLC system.

Appendix C includes a copy of the survey data.

3.7 EXTRACTION WELL ODC-EW-1 MAINTENANCE

Extraction well ODC-EW-1 was only producing a sustained flow rate of 0.9 gallon per minute (gpm), indicating flow was being restricted and the well required maintenance. On October 10, 2019, the well screen at ODC-EW-1 was visually inspected with an endoscopic camera and biofouling of the well was evident. On October 11, 2019, EDAC redeveloped extraction well ODC-EW-1 via repeated pumping and surging to remove fines that had collected in the bottom and to help clear the well screen. Ten well volumes were purged from the well during the redevelopment and were containerized in drums for off-site disposal.

In addition, a replacement pump motor was installed on the pump at extraction well ODC-EW-1 because it had previously failed. The previous motor had exceeded the Amp draw and was not producing water.

On October 11, 2019, ODC-EW-1 was started up and sustained flow at 1.2 gpm, which was an increase of 0.3 from previous pumping rates.

On June 30 and July 1, 2020, HEPACO cleaned the well with a biofouling agent (CETCO LBA cleaner) to clear the screen and increase groundwater flow. The pump was removed from the well and the inside of the well screen and casing were cleaned by pouring the biofouling agent into the well. About 3 gallons of biofouling agent were used for the initial cleaning effort. The screen was then scrubbed with a brush, and an air compressor was used to surge the well screen. One gallon of biofouling agent was added to the well and allowed to sit overnight. The following day, another gallon of biofouling agent was added to the well, and the screen was again scrubbed with a brush and surged with the air compressor. The pump was

then reinstalled in the well and the water and cleaning solution were pumped through the dewatering system and processed by the on-site treatment plant.

Appendix B includes product data for the motor and biofouling agent.

3.8 WASTE DISPOSAL

Soil generated during the work from auger cuttings and trench excavation for the HDPE conduit (below the liner system) was containerized in totes for off-site disposal as TSCA-regulated contaminated soil. A total of five totes of 1 cubic yard capacity were filled from the work. On December 16, 2019, the five totes were transported off site for disposal at the U.S. Ecology Wayne Disposal, Inc. landfill in Belleville, Michigan. A total of 7.5 tons of soil was disposed.

Liquids generated from well redevelopment were containerized in 55-gallon drums. On February 20, 2020, eight drums (440 gallons) were removed from the site and transported to the Veolia North America treatment complex in Port Arthur, Texas, for treatment and disposal.

Both facilities were approved by EPA's off-site rule coordinator prior to removal from the site. Appendix D provides copies of manifests.

3.9 SYSTEM OPERATION

The extraction system was fully operational as of October 18, 2019. The system was started up on October 18, 2019, and extraction well ODC-EW-2R was set to operate at a continuous flow rate of about 2.2 gpm.

On July 1, 2020, extraction well ODC-EW-1 was reactivated and achieved a continuous flow rate of about 2 gpm.

4.0 SUMMARY AND CONCLUSIONS

SulTRAC completed the replacement of extraction well ODC-EW-2R in October 2019 per the design. In addition, extraction well ODC-EW-1 was redeveloped and an endoscopic camera inspection indicated significant biofouling. ODC-EW-1 was therefore cleaned with a biofouling agent in June and July 2020. Extraction well re-development and/or cleaning may become a routine maintenance task for continued proper operation. Monitoring of extraction well flow rates and periodic visual inspection of the well screen may be needed to ascertain if re-development or cleaning is necessary.

All wastes generated during the work were transported off site for proper disposal.

The containment cell and its associated groundwater extraction system are operational and functional (O&F).

FIGURES

N

LEGEND

Approximate Site Boundary

SITE LOCATION
OMC PLANT 2

0 2,000 4,000 Feet

REFERENCE MAP

OUTBOARD MARINE CORPORATION SITE
ODC AND UTILITY CORRIDOR CAPS
OPERABLE UNIT #4

FIGURE 1
SITE LOCATION

SulTRAC

2/28/2020 G:\G\1852\304 OMC\mxd\2020-03\Fig1-SiteLocation.mxd m.banh

REVISIONS		
NO.	DATE	DESCRIPTION

DESIGNED CN
DRAWN MB
CHECKED CN
DATE MARCH 2020

OUTBOARD MARINE CORPORATION SITE
WAUKEGAN, ILLINOIS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5

SCALES:
HORIZONTAL SCALE: AS SHOWN
VERTICAL SCALE: NA

OUTBOARD MARINE CORPORATION SITE
ODC AND UTILITY CORRIDOR CAPS
OPERABLE UNIT #4
SITE MAP SHOWING LAYOUT OF
OLD DIE CAST CONTAINMENT CELL

WORK ASSIGNMENT NO.
WA304

FIGURE
2

G:\G\1852\304 OMC\dwg\2020-03\Fig2-SiteLayout.dwg
2/26/2020

LEGEND

Symbol	Description	Symbol	Description
(red line)	Centerline of Vertical Barrier	——X——	Fence Line
——ESW——	Existing West Containment Cell Slurry Wall	(track symbol)	Railroad Tracks
– – – –585– – – –	Topographic Contour	—— HDPE ——	HDPE Pipe
——W–T——	24-inch diameter Water Transmission Line (aging)	—— PVC ——	PVC Pipe

- △ Piezometer
- ◎ Storm Sewer Manhole
- Ⓦ Well Location
- ◓ Extraction Well
- □ Pull Box
- ○ Sanitary Sewer Standpipe

0 40 80
SCALE IN FEET

REVISIONS		
NO.	DATE	DESCRIPTION

DESIGNED CN
DRAWN MB
CHECKED CN
DATE JULY 2020

ST SulTRAC

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

OUTBOARD MARINE CORPORATION SITE
WAUKEGAN, ILLINOIS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5

SCALES:
HORIZONTAL SCALE: 1" = 40'-0"
VERTICAL SCALE: NA

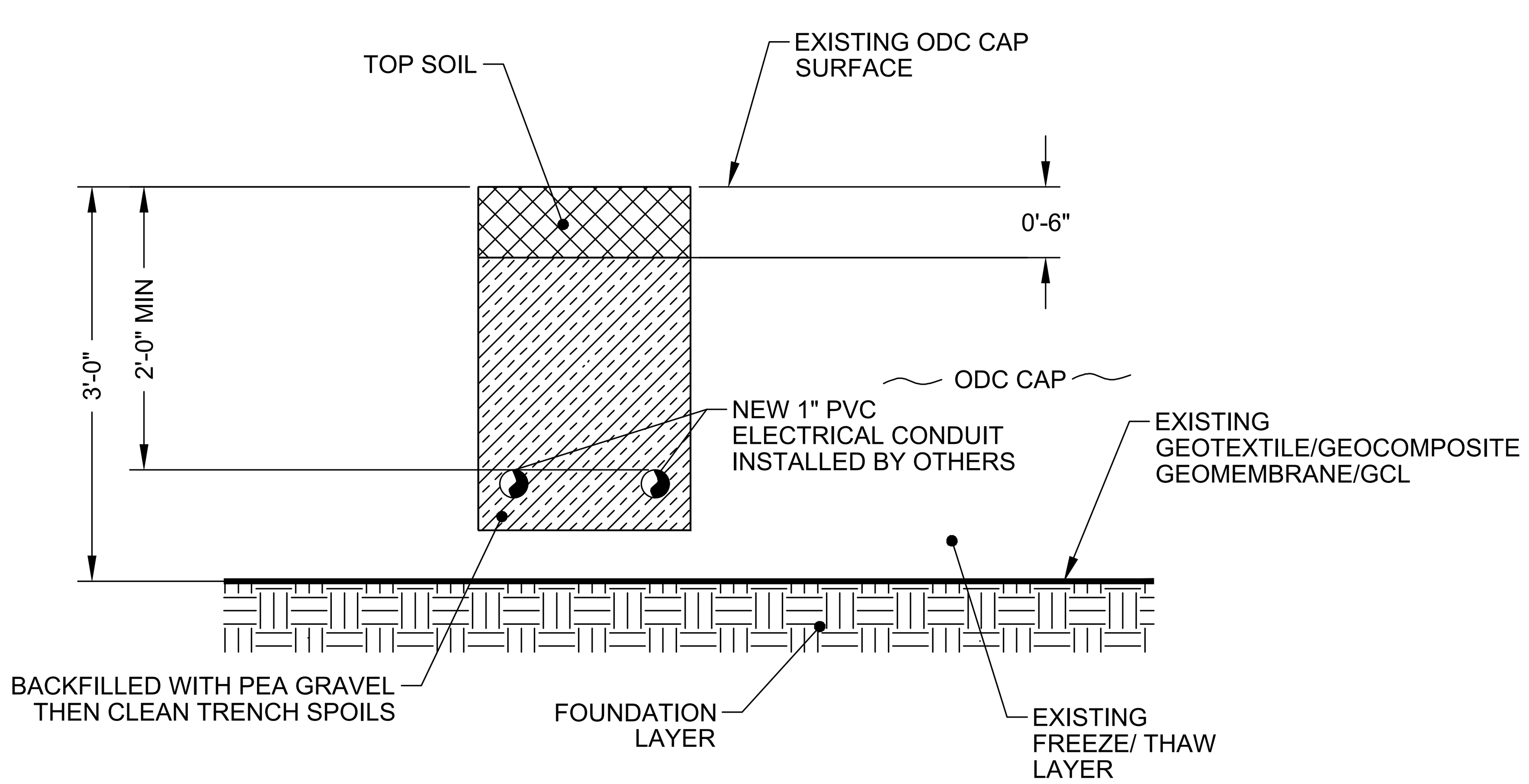
OUTBOARD MARINE CORPORATION SITE
ODC AND UTILITY CORRIDOR CAPS
OPERABLE UNIT #4

ODC CONTAINMENT CELL LAYOUT
RECORD DRAWINGS

WORK ASSIGNMENT NO. WA304

FIGURE 3

7/27/2020
G:\G\1852\304 OMC\dwg\2020-07\Fig3-ODC Layout.dwg

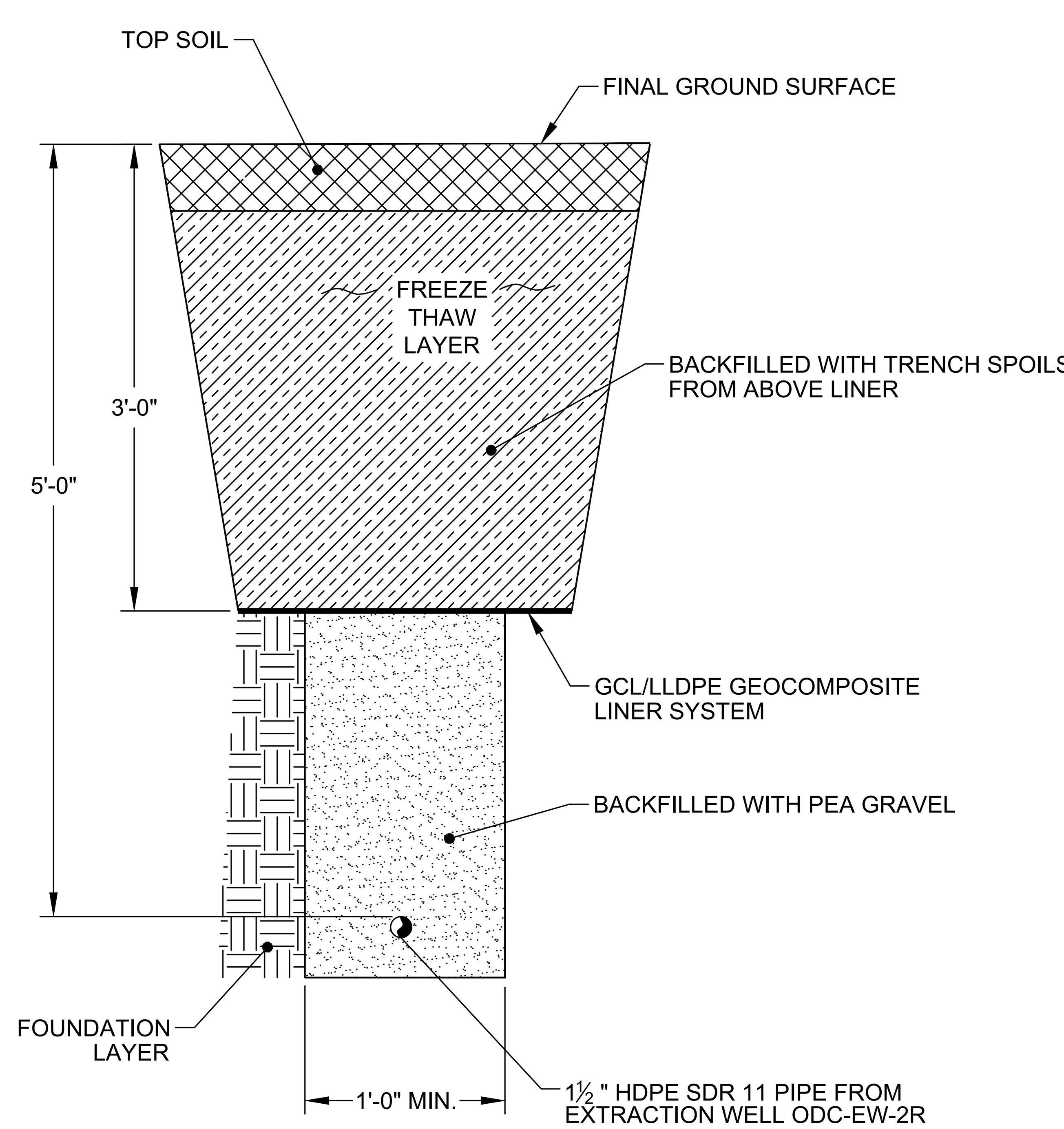


A
Figure 3

EXTRACTION WELL ELECTRICAL AND INSTRUMENTATION CONDUIT

SCALE: 1" = 1'-0"

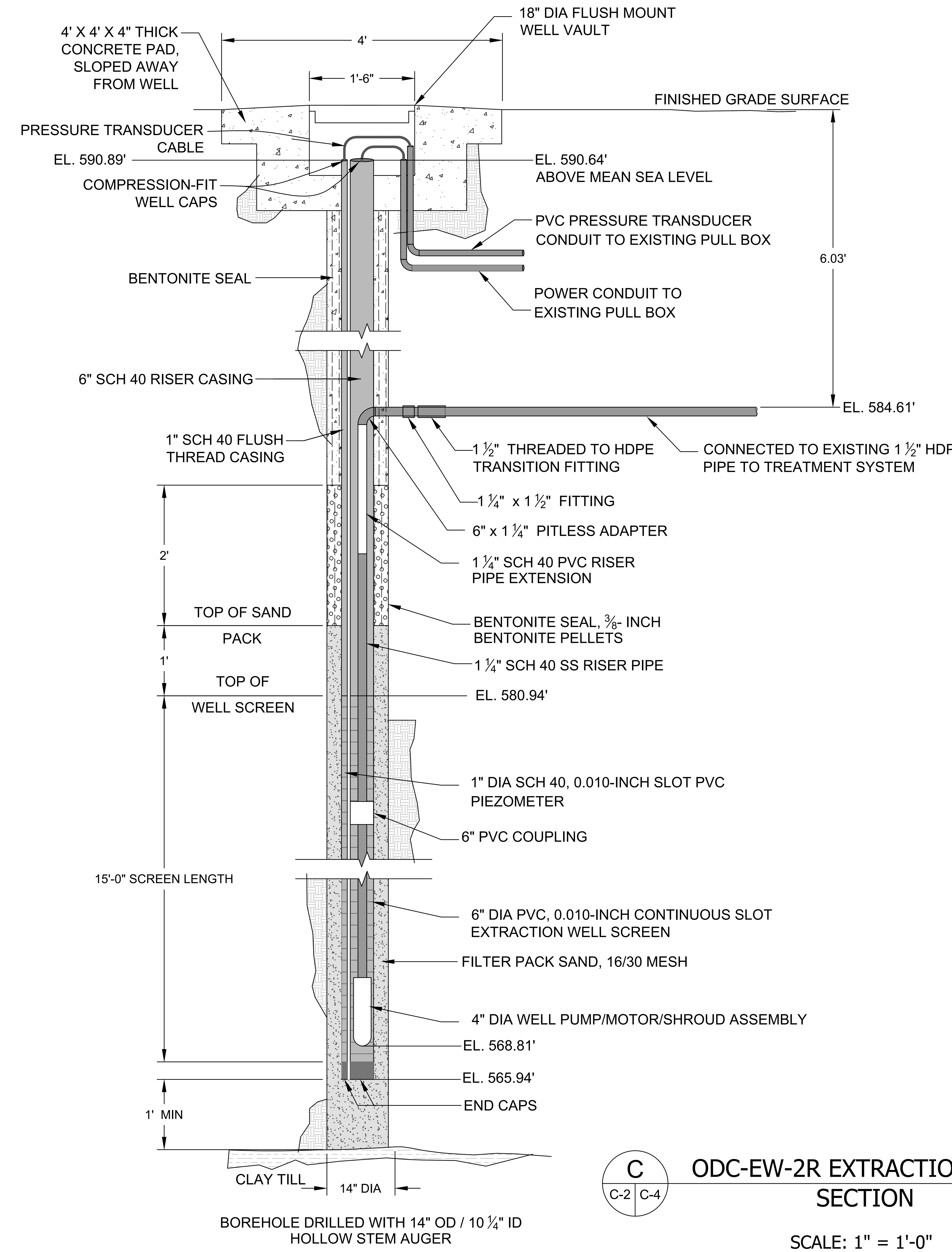
0 1 2
SCALE IN FEET



B
Figure 3

EXTRACTION WELL SYSTEM TYPICAL UTILITY TRENCH SECTION UNDER ODC CAP

NOT TO SCALE



C
C-2 C-4

ODC-EW-2R EXTRACTION WELL SECTION

SCALE: 1" = 1'-0"

0 1 2
SCALE IN FEET

7/24/2020

G:\G\1852\304 OMC\dwg\2020-07\Fig4-Utility Trench.dwg

REVISIONS		
NO.	DATE	DESCRIPTION

DESIGNED CN
DRAWN MB
CHECKED CN
DATE MARCH 2020

SulTRAC

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

OUTBOARD MARINE CORPORATION SITE
WAUKEGAN, ILLINOIS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5

SCALES:
HORIZONTAL SCALE: AS SHOWN
VERTICAL SCALE: NA

OUTBOARD MARINE CORPORATION SITE
ODC AND UTILITY CORRIDOR CAPS
OPERABLE UNIT #4
EXTRACTION WELL AND UTILITY TRENCH DETAILS

WORK ASSIGNMENT NO. WA304

FIGURE 4

APPENDIX A

PHOTOGRAPHS

Photographic Documentation
OMC Plant 2 – OU #4
ODC Extraction Well Replacement
90 East Seahorse Drive
Waukegan, Illinois

Photo: 1 **Date:** September 26, 2018 **Description:** Pump intake at Old Die Cast (ODC)-Extraction Well (EW)-2 (old extraction well). Note that the pump intake screen is clogged with black very fine sand. **Orientation:** Overview	
Photo: 2 **Date:** October 10, 2019 **Description:** Closeup view of well screen in extraction well ODC-EW-2 using downhole camera. Note no presence of biofouling on the screen. **Orientation:** Not applicable	

Photographic Documentation
OMC Plant 2 – OU #4
ODC Extraction Well Replacement
90 East Seahorse Drive
Waukegan, Illinois

Photo: 3 **Date:** October 10, 2019 **Description:** Closeup view of well screen in extraction well ODC-EW-1 using downhole camera. Note presence of biofouling on the screen. **Orientation:** Not applicable.	
Photo: 4 **Date:** October 8, 2019 **Description:** Began excavation through the Old Die Cast (ODC) cap for installation of replacement extraction well ODC-EW-2R. Note extraction well ODC-EW-2 is present in background. **Orientation:** Facing west	

Photographic Documentation
OMC Plant 2 – OU #4
ODC Extraction Well Replacement
90 East Seahorse Drive
Waukegan, Illinois

Photo: 5 **Date:** October 8, 2019 **Description:** Excavation through the ODC cap and liner removal to expose the native subgrade in ODC for installation of the replacement extraction well ODC-EW-2R. **Orientation:** Overview	
Photo: 6 **Date:** October 8, 2019 **Description:** The topsoil and ODC capping soil segregated and stockpiled for reuse. **Orientation:** Facing west	

Photographic Documentation
OMC Plant 2 – OU #4
ODC Extraction Well Replacement
90 East Seahorse Drive
Waukegan, Illinois

Photo: 7 **Date:** October 10, 2019 **Description:** EDAC drilling borehole for installing the replacement extraction well ODC-EW-2R. **Orientation:** Facing south	
Photo: 8 **Date:** October 10, 2019 **Description:** The excavation and auger placement for the replacement extraction well ODC-EW-2R. **Orientation:** Overview.	

Photographic Documentation
OMC Plant 2 – OU #4
ODC Extraction Well Replacement
90 East Seahorse Drive
Waukegan, Illinois

Photo: 9 **Date:** October 10, 2019 **Description:** The extraction pump and shroud assembly for replacement extraction well ODC-EW-2R. **Orientation:** Overview.	
Photo: 10 **Date:** October 11, 2019 **Description:** The HDPE water discharge line connection to the pitless adapter on the replacement extraction well ODC-EW-2R. **Orientation:** Overview.	

Photo: 11 **Date:** October 11, 2019 **Description:** EDAC installing the extraction well pump. Note the pitless adapter in photo. **Orientation:** Facing southwest.	
Photo: 12 **Date:** October 14, 2019 **Description:** The excavation with pea gravel backfill below liner system. **Orientation:** Overview.	

Photo: 13 **Date:** October 16, 2019 **Description:** The GCL patch after installation. The new GCL patch is placed under the old GCL with a 6-inch minimum overlap. **Orientation:** Overview.	
Photo: 14 **Date:** October 16, 2019 **Description:** The linear low-density polyethylene (LLDPE) patch installed, and penetrations booted and sealed. **Orientation:** Overview.	

Photographic Documentation
OMC Plant 2 – OU #4
ODC Extraction Well Replacement
90 East Seahorse Drive
Waukegan, Illinois

Photo: 15 **Date:** October 17, 2019 **Description:** The geocomposite installed above the LLDPE. **Orientation:** Overview.	
Photo: 16 **Date:** October 17, 2019 **Description:** Pier Electric installing conduit for electric and control cables from existing pull box to the replacement extraction well ODC-EW-2R. **Orientation:** Facing northeast.	

Photographic Documentation
OMC Plant 2 – OU #4
ODC Extraction Well Replacement
90 East Seahorse Drive
Waukegan, Illinois

Photo: 17 **Date:** October 18, 2019 **Description:** Manhole installed over replacement extraction well ODC-EW-2R, clay cap and topsoil also installed. Note the adjacent ODC-EW-2 in foreground. **Orientation:** Facing south.	
Photo: 18 **Date:** October 18, 2019 **Description:** Restored replacement extraction well ODC-EW-2R work area, with erosion control blanket. **Orientation:** Facing northwest.	

APPENDIX B

PRODUCT DATA

ATTACHMENT 1

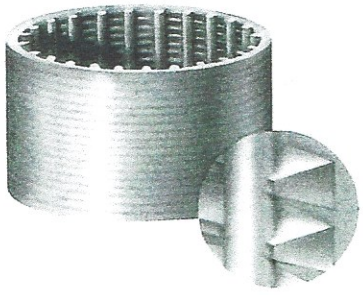
PVC Vee-Wire

Commonly used in shallow wells, PVC Vee-Wire screens present higher open area screen available in PVC. PVC Vee-Wire screens resist corrosion from aggressive waters and are ideal for many environmental applications. PVC screens are furnished with F480 flush threads or plain ends for connecting to Johnson Screens PVC fittings.

Pipe Size (in.)	Nominal O.D. (in.)	Dia. I.D. (in.)[1]	Weight/ ft. (lbs.)	Tensile Strength (lbs)[2]	Hang Weight (lbs.)[4]	Open Area (sq in.) Per Foot of Screen / Collapse Strength - PSI[3]					
						Screen Slot Size (in.)					
						0.006	0.010	0.020	0.030	0.040	0.050
1 - 1/4 PS	1.7	1.2	0.7	780	195	3.1	4.9	9.2	12.8	16.0	18.9
						270	260	240	230	210	200
1- 1/2 PS	1.9	1.5	0.8	1200	310	3.4	5.5	10.2	14.3	17.9	21.1
						180	180	160	150	140	130
2P/3T	2.4	1.9	0.8	1300	330	4.3	7.0	12.9	18.1	22.6	26.6
						95	92	85	79	74	70
2 PS*	2.6	2.0	0.9	1300	330	4.7	7.5	14.0	19.6	24.5	28.8
						72	70	65	61	57	54
3 PS	3.5	2.9	1.5	1800	460	5.4	8.8	16.5	23.3	29.3	34.7
						170	160	150	150	140	130
4 Special	4.5	3.9	1.7	2100	530	7.0	11.3	21.2	29.9	37.7	44.6
						81	78	74	69	65	62
4 PS*	4.6	4.0	1.8	2100	530	7.1	11.6	21.7	30.6	38.5	45.6
						75	73	68	64	60	57
5 PS	5.7	4.9	2.5	3900	980	8.3	13.4	25.3	35.8	45.2	53.7
						73	72	68	65	62	59
6 PS	6.6	5.9	3.7	4600	1200	8.0	13.1	24.9	35.5	45.2	54.1
						73	72	68	65	62	59
8 PS	8.8	7.6	4.6	5500	1400	13.6	22.1	41.5	58.6	73.7	87.3
						60	59	55	52	49	46

1. Clear ID's are minimum inside diameters
2. Tensile values are based on support rod area, other values are based on flush-thread test values
3. Collapse strengths are calculated values - no safety factor included
4. Hang weights are the maximum combined weight of riser and screen to be hung from the top screen joint
5. All strength properties are based on 73° F
6. Alternate construction for environmental applications

*Alternate construction for environmental applications

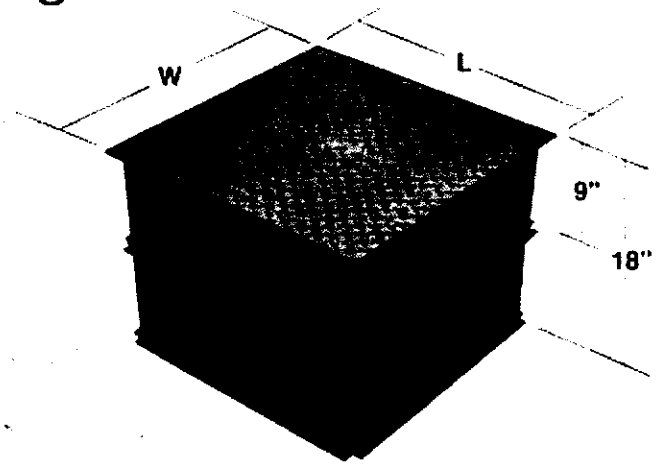


Designs up to 6 in. are made with standard rod base.

The 8 in. design features a channel-rod base for enhanced strength.

WELL SECURITY

SQUARE



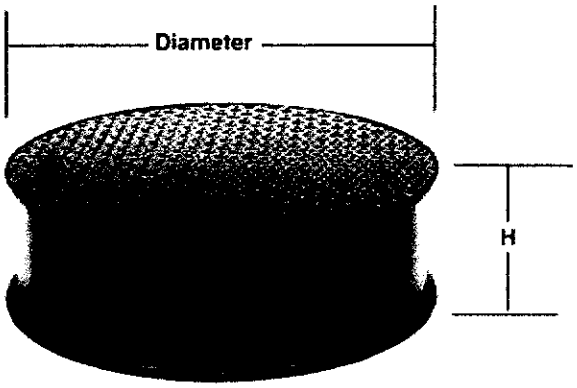
Standard Features:

- 1/4" Reinforced Diamond Plate Covers (30" & smaller)
- 3/8" Reinforced Diamond Plate Covers (36" & larger)
- 1/2" Reinforced Diamond Plate Covers (48" & larger)
- 12 ga. Steel Skirt with Flanged Bottom
- Lid Removal Finger Hole (as shown)

Optional:

- 12 ga. Steel Extension, depth as required
- 1/4 Turn Lock-Down
- Watertight
- Recessed Handle
- Heavy Duty

ROUND



Standard Features:

- One Piece 12 ga. Steel Roll Formed Construction with Bottom Leveling Flange
- Reinforced Top Lip with 1/2" x 1/2" Structural Steel Bar
- 4 Anchoring Clips
- 3/8" Reinforced Diamond Plate Cover
- Lid Removal Finger Hole

Optional:

- 12 ga. Steel Extension, depth as required
- 1/4 Turn Lock-Down
- Watertight
- Recessed Handle (as shown)
- Heavy Duty

Square Manholes

	Height = 9"	Height = 18"
SIZE	WEIGHT (LBS.)	WEIGHT (LBS.)
12" x 12"	25	36
18" x 18"	46	63
20" x 20"	55	74
24" x 24"	73	96
24" x 30"	88	114
30" x 30"	106	134
36" x 36"	190	224
48" x 48"	330	386

Round Manholes

	Height = 9"	Height = 18"
SIZE	WEIGHT (LBS.)	WEIGHT (LBS.)
12"	32	40
18"	47	68
24"	66	87
30"	114	139
36"	157	184
38"	175	208
42"	263	299
48"	330	369

GRUNDFOS

Company name:	-
Created by:	-
Phone:	-
Fax:	-
Date:	-

Position	Count	Description
	1	**MS 402**

EW-1 and EW-2R Motor

Product photo could vary from the actual product

Product No.: 79302002
The motor is a 3-phase motor of the canned type with a sand shield, liquid-lubricated bearings and pressure-equalizing diaphragm.

Liquid:
Max liquid temperature at 0.15 m/sec: 104 °F

Technical:

Shaft seal for motor:	LIPSEAL
Approvals on nameplate:	CE,GOST2,CSACOMP

Materials:

Motor:	Stainless steel DIN W.-Nr. 1.4301 AISI 304

Installation:

Maximum ambient pressure:	218 psi
Motor diameter:	4 inch

Electrical data:

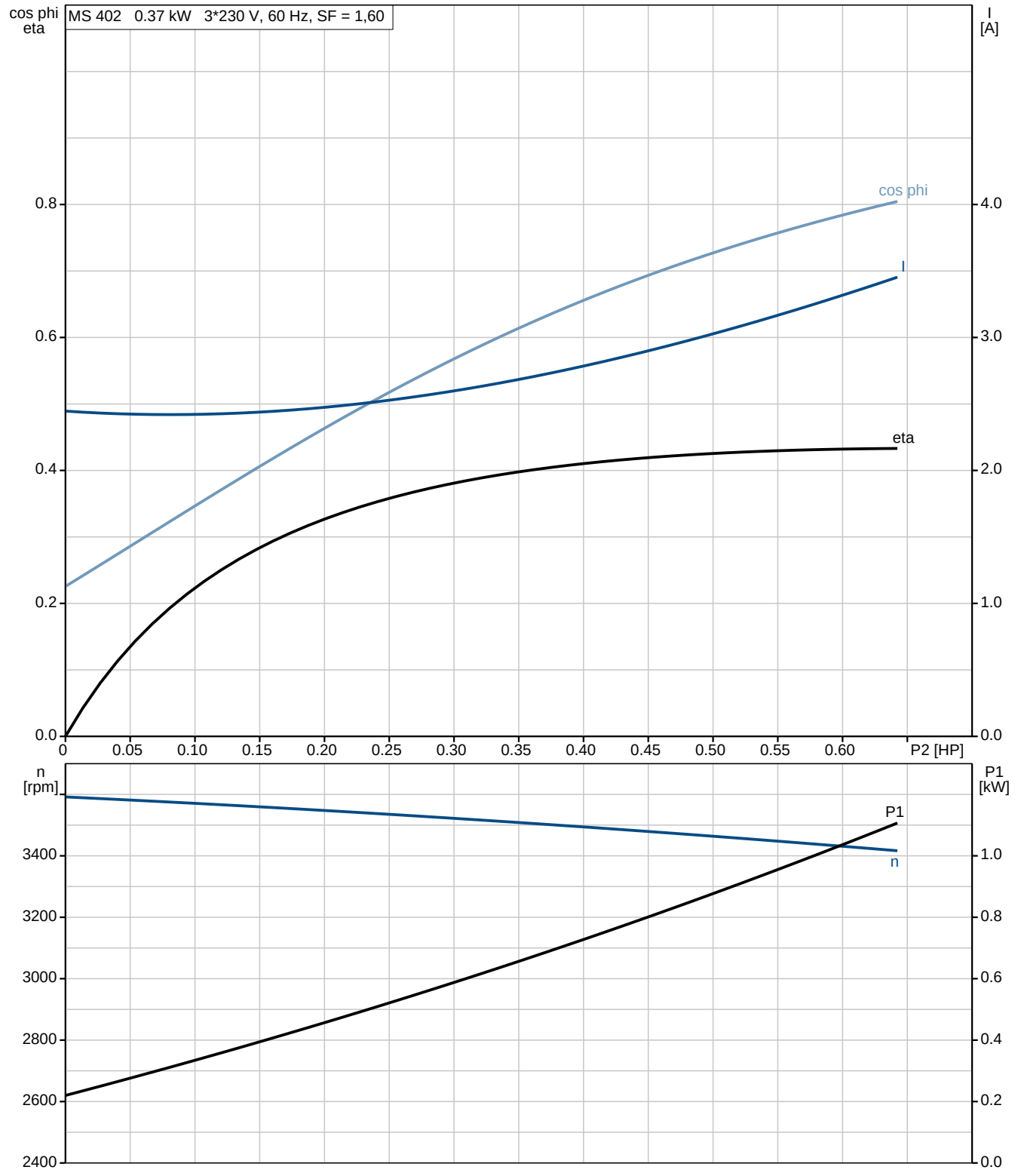
Motor type:	MS402
Rated power - P2:	0.5 HP
Main frequency:	60 Hz
Rated voltage:	3 x 230 V
Voltage tolerance:	+10/-10 %
Start. method:	direct-on-line
Service factor:	1,60
Rated current:	3.15 A
Starting current:	460 %
Cos phi - power factor:	0,72
Rated speed:	3450 rpm
Locked-rotor torque:	230 %
Moment of inertia:	0.008 lb ft²
Enclosure class (IEC 34-5):	IP68
Insulation class (IEC 85):	B

Position	Count	Description
		Built-in temperature transmitter: No

GRUNDFOS

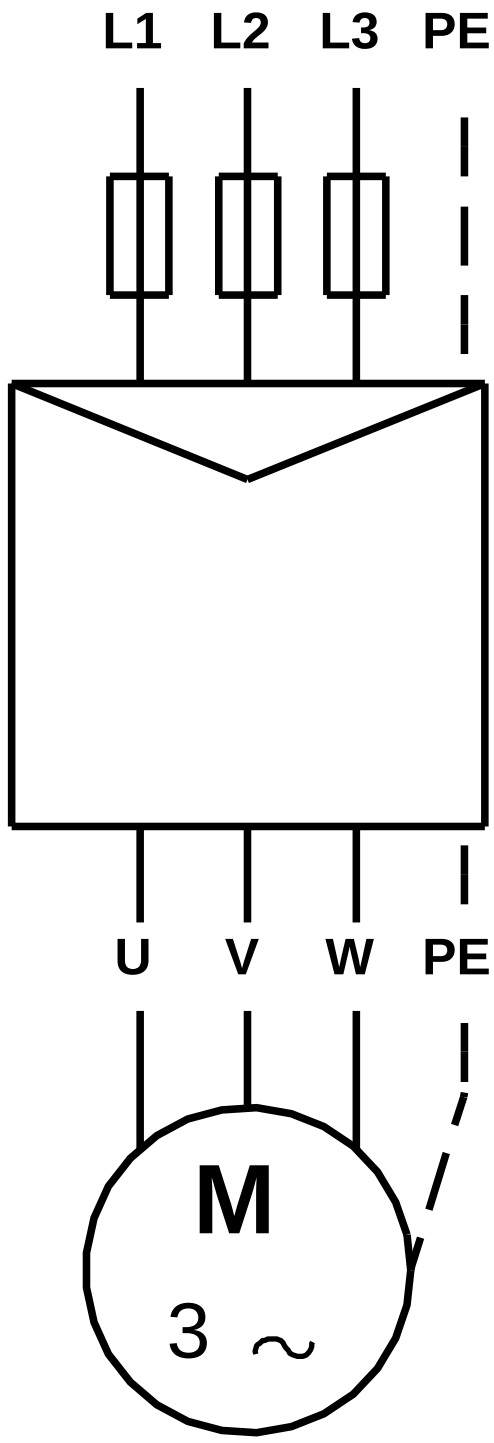
Company name:	-
Created by:	-
Phone:	-
Fax:	-
Date:	-

79302002 MS 402 60 Hz



Company name: -
Created by: -
Phone: -
Fax: -
Date: -

79302002 MS 402 60 Hz



All units are [mm] unless otherwise presented.

GRUNDFOS

Ordering data

79302002 MS 402 60 Hz **Product No.: 79302002**

Company name: - Date: -
Created by: - Phone: - Fax: -

Project: - Client number: -
Contact: - Reference number: -

Electrical data:

Frequency		60 Hz
Rated motor voltage		230 V
Rated motor power		0.5 HP
Rated motor speed		3450 rpm
Rated motor torque	-	-
Wiring connection	-	-
Rated motor current		3.15 A
Max motor current	-	-
Efficiency class	-	-
Full load Efficiency %	-	-
Power factor		0,72
Starting- / Rated motor current (50/60)		/
Breakdown- / Rated motor torque (50/60)		/ %
Starting- / Rated motor torque (50/60)		/

Mechanical data:

Noise measurements (50/60)	- -
Moment of inertia	0.008 lb ft²
Drain holes	Yes (closed)
Bearing DE	-
Bearing NDE	-
Bearing arrangement	NDE-locked
Type of bearing DE	-
Bearing seal DE	-
Characteristic of grease DE	-
Type of bearing NDE	-
Bearing seal NDE	-
Characteristic of grease NDE	-
Regreasing device	No
Type of lubrication	-
Relubrication interval	-
Quantity of grease for relubrication	-
External grounding	-
Color/type	-

Explosion protection:

Type of protection	-

Ambient conditions:

Ambient temperature	
Altitude above sea level	3280 ft
Approvals and specifications	IEC 60034

General data:

Frame size	MS402
Type of construction	-
Weight, without optional accessories	-
Frame material	-
Degree of protection	IP IP68
Method of cooling, TEFC	-
Vibration class	
Insulation class	155(F) to 130(B)
Duty type	-
Direction of rotation	/

Terminal box:

Material of terminal box	-
Cable entry	-
Cable gland	-

Protection:

Built-in protection	-

Butt fusion stainless steel female threaded transition fitting

GRUNDFOS

Company name:
Created by:
Phone:

Pump at ODC-EW-1

Date: 7/21/2017

Position	Count	Description
	1	**7S05-8** Product No.: 3013008 Multi-stage submersible pump for raw water supply, groundwater lowering and pressure boosting. The pump is suitable for pumping clean, thin, non-agressive liquids without solid particles or fibers. The pump is made entirely of Stainless steel DIN W.-Nr. DIN W.-Nr. 1.4301 and suitable for horizontal and vertical installation. The pump is fitted with a built-in non-return valve. The motor is a 3-phase motor of the canned type with a sand shield, liquid-lubricated bearings and pressure-equalizing diaphragm. **Liquid:** Pumped liquid: Water Maximum liquid temperature: 104 °F Max liquid temperature at 0.15 m/sec: 104 °F Liquid temperature during operation: 68 °F Density: 62.29 lb/ft³ **Technical:** Speed for pump data: 3450 rpm Shaft seal for motor: LIPSEAL Approvals on nameplate: CE,EAC,CSACOMP Curve tolerance: ISO9906:2012 3B **Materials:** Pump: Stainless steel DIN W.-Nr. 1.4301 AISI 304 Impeller: Stainless steel DIN W.-Nr. 1.4301 AISI 304 Motor: Stainless steel DIN W.-Nr. 1.4301 AISI 304 **Installation:** Pump outlet: 1"NPT Motor diameter: 4 inch **Electrical data:** Motor type: MS402 Rated power - P2: 0.5 HP Power (P2) required by pump: 0.5 HP Main frequency: 60 Hz Rated voltage: 3 x 230 V Service factor: 1,60 Rated current: 3.15 A Cos phi - power factor: 0,72 Rated speed: 3450 rpm Start. method: direct-on-line Enclosure class (IEC 34-5): IP68 Insulation class (IEC 85): B Built-in temperature transmitter: No

GRUNDFOS

Company name:
Created by:
Phone:

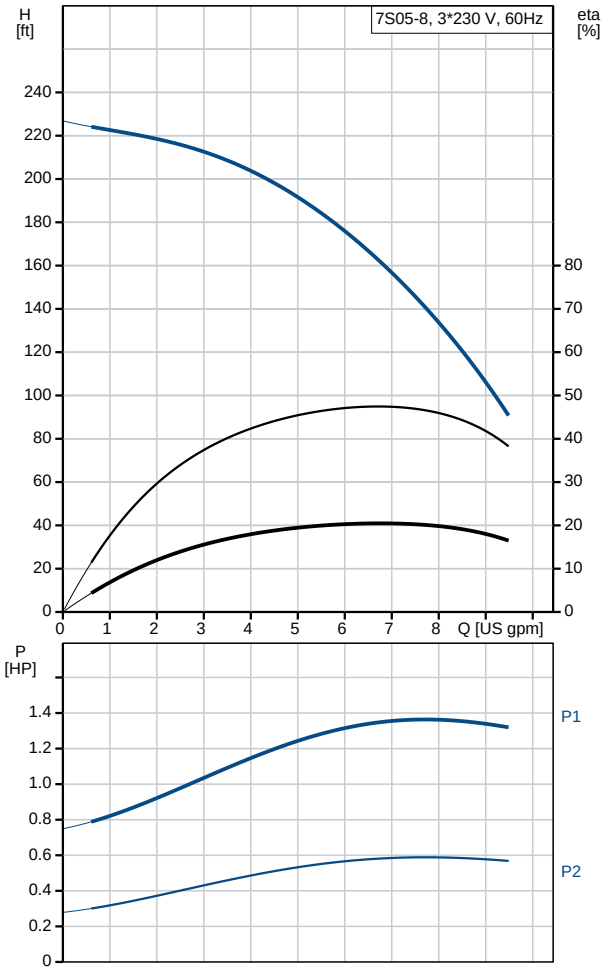
Date: 7/21/2017

Position	Count	Description	
		Others:	
		Net weight:	19.8 lb
		Gross weight:	22.1 lb
		Shipping volume:	0.28 ft³

Company name:
Created by:
Phone:

Date: 7/21/2017

Description	Value
General information:	
Product name:	7S05-8
Product No.:	3013008
EAN:	5700390224035
Technical:	
Speed for pump data:	3450 rpm
Shaft seal for motor:	LIPSEAL
Approvals on nameplate:	CE,EAC,CSACOMP
Curve tolerance:	ISO9906:2012 3B
Pump Number:	03010008
Stages:	8
Model:	A
Valve:	pump with built-in non-return valve
Materials:	
Pump:	Stainless steel
	DIN W.-Nr. 1.4301
	AISI 304
Impeller:	Stainless steel
	DIN W.-Nr. 1.4301
	AISI 304
Motor:	Stainless steel
	DIN W.-Nr. 1.4301
	AISI 304
Installation:	
Pump outlet:	1"NPT
Motor diameter:	4 inch
Liquid:	
Pumped liquid:	Water
Maximum liquid temperature:	104 °F
Max liquid temperature at 0.15 m/sec:	104 °F
Liquid temperature during operation:	68 °F
Density:	62.29 lb/ft³
Electrical data:	
Motor type:	MS402
Applic. motor:	NEMA
Rated power - P2:	0.5 HP
Power (P2) required by pump:	0.5 HP
KVA code:	N
Main frequency:	60 Hz
Rated voltage:	3 x 230 V
Service factor:	1,60
Rated current:	3.15 A
Cos phi - power factor:	0,72
Rated speed:	3450 rpm
Start. method:	direct-on-line
Enclosure class (IEC 34-5):	IP68
Insulation class (IEC 85):	B
Motor protection:	NONE
Thermal protec:	external
Built-in temperature transmitter:	No
Motor Number:	79302002
Cable number:	00795B79



GRUNDFOS

Company name:
Created by:
Phone:

Date: 7/21/2017

Description	Value
Others:	
Net weight:	19.8 lb
Gross weight:	22.1 lb
Shipping volume:	0.28 ft³
Sales region:	Namreg

GRUNDFOS

Company name:
Created by:
Phone:

ODC-EW-2R Pump

Date: 01/04/2020

Qty.	Description
1	**5S05-9**

Product No.: 81545095

Multi-stage submersible pump for raw water supply, groundwater lowering and pressure boosting. The pump is suitable for pumping clean, thin, non-agressive liquids without solid particles or fibres.

The pump is made entirely of Stainless steel DIN W.-Nr. EN 1.4301.

The motor is a 1-phase motor with sand shield, liquid-lubricated bearings and pressure equalizing diaphragm.

Liquid:

Pumped liquid:	Water
Maximum liquid temperature:	60 °C
Max liquid t at 0.15 m/sec:	40 °C
Selected liquid temperature:	20 °C
Density:	998.2 kg/m³

Technical:

Pump speed on which pump data are based: 3450 rpm

Rated flow:	1 m³/h
Rated head:	53 m
Shaft seal for motor:	LIPSEAL
Approvals on nameplate:	CE,EAC,CSACOMP,UR
Curve tolerance:	ISO9906:2012 3B
Motor version:	T40
Specification for shaft end:	SPLINE

Materials:

Pump:	Stainless steel EN 1.4301 AISI 304
Impeller:	Stainless steel EN 1.4301 AISI 304
Motor:	Stainless steel DIN W.-Nr. 1.4301 AISI 304

Installation:

Maximum ambient pressure:	15 bar
Pump outlet:	1"NPT
Motor diameter:	4 inch

Electrical data:

Motor type:	MS402
Type of motor:	CSIR
Rated power - P2:	0.37 kW
Power (P2) required by pump:	0.37 kW
Mains frequency:	60 Hz
Rated voltage:	1 x 230 V

GRUNDFOS

Company name:
Created by:
Phone:

Date: 01/04/2020

Qty.	Description	
	Service factor:	1.60
	Rated current:	6 A
	Starting current:	410 %
	Cos phi - power factor:	0.76
	Rated speed:	3450 rpm
	Start. method:	direct-on-line
	Enclosure class (IEC 34-5):	IP68
	Insulation class (IEC 85):	B
	Built-in temp. transmitter:	no
	Motor No:	79453102
	Others:	
	ErP status:	EuP Standalone/Prod.
	Net weight:	10.2 kg
	Gross weight:	11.3 kg
	Shipping volume:	9.98 m³

PRODUCT DATA SHEET

GSE BentoLiner NSL Geosynthetic Clay Liner

GSE BentoLiner "NSL" is a needle-punched reinforced composite geosynthetic clay liner (GCL) comprised of a uniform layer of granular sodium bentonite encapsulated between a woven and a nonwoven geotextile. The product is intended for moderate to steep slopes and moderate to high load applications where increased internal shear strength is required.

AT THE CORE:
This composite clay liner is intended for moderate to steep slopes and moderate to high load applications where increased internal shear strength is required.

Product Specifications

Tested Property	Test Method	Frequency	Value
Geotextile Property			
Cap Nonwoven, Mass/Unit Area	ASTM D 5261	1/200,000 ft²	6.0 oz/yd² MARV(1)
Carrier Woven, Mass/Unit Area	ASTM D 5261	1/200,000 ft²	3.1 oz/yd² MARV
Bentonite Property			
Swell Index	ASTM D 5890	1/100,000 lb	24 ml/2 g min
Moisture Content	ASTM D 4643	1/100,000 lb	12% max
Fluid Loss	ASTM D 5891	1/100,000 lb	18 ml max
Finished GCL Property			
Bentonite, Mass/Unit Area(2)	ASTM D 5993	1/40,000 ft²	0.75 lb/ft² MARV
Tensile Strength(3)	ASTM D 6768	1/40,000 ft²	30 lb/in MARV
Peel Strength	ASTM D 6496 ASTM D 4632(4)	1/40,000 ft²	3.5 lb/in MARV 21 lb MARV
Hydraulic Conductivity(5)	ASTM D 5887	1/Week	5 x 10^{-9} cm/sec max
Index Flux(5)	ASTM D 5887	1/Week	1 x 10^{-8} m³/m²/sec max
Internal Shear Strength(6)	ASTM D 6243	Periodically	500 psf Typical
TYPICAL ROLL DIMENSIONS			
Width x Length(7)	Typical	Every Roll	15.5 ft x 150 ft
Area per Roll	Typical	Every Roll	2,325 ft²
Packaged Weight	Typical	Every Roll	2,600 lb

NOTES:
- (1)Minimum Average Roll Value.
- (2)At 0% moisture content.
- (3)Tested in machine direction.
- (4)Modified ASTM D 4632 to use a 4 in wide grip. The maximum peak of five specimens averaged in machine direction.
- (5)Deaired, deionized water @ 5 psi maximum effective confining stress and 2 psi head pressure.
- (6)Typical peak value for specimen hydrated for 24 hours and sheared under a 200 psf normal stress.
- (7)Roll widths and lengths have a tolerance of ±1%.

GSE is a leading manufacturer and marketer of geosynthetic lining products and services. We've built a reputation of reliability through our dedication to providing consistency of product, price and protection to our global customers.

Our commitment to innovation, our focus on quality and our industry expertise allow us the flexibility to collaborate with our clients to develop a custom, purpose-fit solution.

GSE ENVIRONMENTAL™

DURABILITY RUNS DEEP

For more information on this product and others, please visit us at GSEworld.com, call 800.435.2008 or contact your local sales office.

PRODUCT DATA SHEET

GSE FabriNet 200 mil Geocomposite

GSE FabriNet geocomposite consists of a 200 mil thick GSE HyperNet geonet heat-laminated on one or both sides with a GSE nonwoven needle-punched geotextile. The geotextile is available in mass per unit area range of 6 oz/yd² to 16 oz/yd². The geocomposite is designed and formulated to perform drainage function under a range of anticipated site loads, gradients and boundary conditions.

AT THE CORE:
A 200 mil thick HyperNet geonet heat-laminated on one or both sides with a nonwoven needlepunched geotextile.

Product Specifications

Tested Property	Test Method	Frequency	Minimum Average Roll Value[1]		
Geocomposite			6 oz/yd²	8 oz/yd²	10 oz/yd²
Transmissivity[2], gal/min/ft, (m²/sec) Double-Sided Composite Single-Sided Composite	ASTM D 4716	1/540,000 ft²	 0.5 ($1x10^{-1}$) 4.8 ($1x10^{-3}$)	 0.5 ($1x10^{-4}$) 4.8 ($1x10^{-3}$)	 0.4 ($9x10^{-5}$) 4.3 ($9x10^{-4}$)
Ply Adhesion, lb/in	ASTM D 7005	1/50,000 ft²	1.0	1.0	1.0
Geonet Core[1,3] – GSE HyperNet					
Geonet Core Thickness, mil	ASTM D 5199	1/50,000 ft²	200	200	200
Transmissivity[2], gal/min/ft (m²/sec)	ASTM D 4716		9.6 (2×10^{-3})	9.6 (2×10^{-3})	9.6 (2×10^{-3})
Density, g/cm³	ASTM D 1505	1/50,000 ft²	0.94	0.94	0.94
Tensile Strength (MD), lb/in	ASTM D 7179	1/50,000 ft²	45	45	45
Carbon Black Content, %	ASTM D 4218	1/50,000 ft²	2.0	2.0	2.0
Geotextile[1,3]					
Mass per Unit Area, oz/yd²	ASTM D 5261	1/90,000 ft²	6	8	10
Grab Tensile Strength, lb	ASTM D 4632	1/90,000 ft²	160	220	260
Grab Elongation	ASTM D 4632	1/90,000 ft²	50%	50%	50%
CBR Puncture Strength, lb	ASTM D 6241	1/540,000 ft²	435	575	725
Trapezoidal Tear Strength, lb	ASTM D 4533	1/90,000 ft²	65	90	100
AOS, US sieve[1], (mm)	ASTM D 4751	1/540,000 ft²	70 (0.212)	80 (0.180)	100 (0.150)
Permittivity, sec^{-1}	ASTM D 4491	1/540,000 ft²	1.5	1.3	1.0
Water Flow Rate, gpm/ft²	ASTM D 4491	1/540,000 ft²	110	95	75
UV Resistance, % retained	ASTM D 4355 (after 500 hours)	per formulation	70	70	70
NOMINAL ROLL DIMENSIONS[4]					
Roll Width, ft			14.75	14.75	14.75
Roll Length, ft	Double-Sided Composite Single-Sided Composite		270 300	260 300	230 290
Roll Area, ft²	Double-Sided Composite Single-Sided Composite		3,982 4,425	3,835 4,425	3,392 4,277

NOTES:
- [1] All geotextile properties are minimum average roll values except AOS which is maximum average roll value and UV resistance is typical value. Geonet core thickness is nominal value.
- [2] Gradient of 0.1, normal load of 10,000 psf, water at 70°F between steel plates for 15 minutes. Contact GSE for performance transmissivity value for use in design.
- [3] Component properties prior to lamination.
- [4] Roll widths and lengths have a tolerance of ±1%.

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PRODUCT DATA SHEET

GSE UltraFlex Smooth Geomembrane

GSE UltraFlex is a smooth linear low density polyethylene (LLDPE) geomembrane manufactured with the highest quality resin specifically formulated for flexible geomembranes. This product is used in applications that require increased flexibility and elongation properties where differential or localized subgrade settlements may occur such as in a landfill closure application.

[*]

AT THE CORE:
An LLDPE geomembrane that is used in applications requiring increased flexibility and elongation properties, such as landfill closures and mining applications.

Product Specifications

These product specifications meet GRI GM17

Tested Property	Test Method	Frequency	Minimum Average Value			
			40 mil	60 mil	80 mil	100 mil
Thickness, mil Lowest individual reading	ASTM D 5199	every roll	40 36	60 54	80 72	100 90
Density, g/cm³ (max.)	ASTM D 1505	200,000 lb	0.939	0.939	0.939	0.939
Tensile Properties (each direction) Strength at Break, lb/in-width Elongation at Break, %	ASTM D 6693, Type IV Dumbbell, 2 ipm G.L. 2.0 in	20,000 lb	 152 800	 228 800	 304 800	 380 800
Tear Resistance, lb	ASTM D 1004	45,000 lb	22	33	44	55
Puncture Resistance, lb	ASTM D 4833	45,000 lb	56	84	112	140
Carbon Black Content, % (Range)	ASTM D 1603*/4218	20,000 lb	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0	2.0 - 3.0
Carbon Black Dispersion	ASTM D 5596	45,000 lb	Note(1)	Note(1)	Note(1)	Note(1)
Oxidative Induction Time, mins	ASTM D 3895, 200°C; O_2, 1 atm	200,000 lb	>100	>100	>100	>100
TYPICAL ROLL DIMENSIONS						
Roll Length(2), ft			870	560	430	340
Roll Width(2), ft			22.5	22.5	22.5	22.5
Roll Area, ft²			19,575	12,600	9,675	7,650

NOTES:
- (1)Dispersion only applies to near spherical agglomerates. 9 of 10 views shall be Category 1 or 2. No more than 1 view from Category 3.
- (2)Roll lengths and widths have a tolerance of ±1 %.
- GSE UltraFlex is available in rolls weighing approximately 3,900 lb.
- All GSE geomembranes have dimensional stability of ±2% when tested according to ASTM D 1204 and LTB of <-77°C when tested according to ASTM D 746.
- *Modified.

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GSE ENVIRONMENTAL™

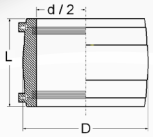
DURABILITY RUNS DEEP

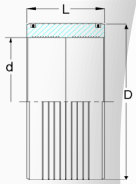
For more information on this product and others, please visit us at GSEworld.com, call 800.435.2008 or contact your local sales office.

SDR 11 Electrofusion Coupler | IPS Series

Water - 200 PSI (ASTM) / 232 PSI (ISO) | Gas - 100 PSI @ 73° F Sustainable Maximum Operating Pressure

Suitable for use on IPS SDR 9 to SDR 17 HDPE Pipe (Fusing from SDR 21 to SDR 32.5 may require special barcode)





Nominal Size	OD	D	L	Weight	Item Code	FM Class
1" IPS	1.315"	1.7"	3.4"	0.1 lbs.	200302	FM 200/232
1 ¼" IPS	1.660"	2.2"	3.7"	0.2 lbs.	200303	FM 200/232
1 ½" IPS	1.900"	2.7"	3.9"	0.4 lbs.	200304	FM 200/232
2" IPS	2.375"	3.2"	4.6"	0.5 lbs.	200305	FM 200/232
3" IPS	3.500"	4.4"	5.0"	0.9 lbs.	200307	FM 200/232
4" IPS	4.500"	5.9"	5.9"	2.1 lbs.	200310	FM 200/232
5" IPS	5.563"	6.9"	6.5"	2.9 lbs.	200312	FM 200/232
6" IPS	6.625"	8.7"	7.9"	5.3 lbs.	200314	FM 200/232
8" IPS	8.625"	10.7"	8.9"	8.6 lbs.	200317	FM 200/232
10" IPS	10.750"	13.3"	9.8"	15.4 lbs.	200320	FM 200/232
12" IPS	12.750"	15.9"	11.4"	24.3 lbs.	200323	FM 200/232
14" IPS	14.000"	17.2"	11.8"	30.9 lbs.	200326	FM 200/232
16" IPS (1)	16.000"	19.8"	13.9"	40.1 lbs.	200329	FM 200/232
18" IPS (1)	18.000"	22.3"	16.7"	65.3 lbs.	200332	FM 200/232
20" IPS (1)	20.000"	24.8"	18.0"	99.2 lbs.	200335	FM 200/232
22" IPS (1)	22.000"	27.4"	19.5"	121.3 lbs.	200336	FM 200/232
24" IPS (1)	24.000"	30.6"	19.8"	160.9 lbs.	200338	FM 200/232
26" IPS (1)(2)	26.000"	31.9"	20.2"	172.0 lbs.	200339	FM 200
28" IPS (1)(2)	28.000"	34.5"	20.7"	176.4 lbs.	200341	FM 200
30" IPS (1)(2)	30.000"	37.0"	20.7"	237.7 lbs.	200343	
32" IPS (1)(2)	32.000"	39.6"	20.7"	264.6 lbs.	200345	
34" IPS (1)(2)	34.000"	42.1"	21.7"	308.7 lbs.	200356	
36" IPS (1)(2)	36.000"	44.1"	21.1"	319.7 lbs.	200347	
42" IPS (1)(2)	42.000"	51.2"	22.6"	465.2 lbs.	200349	
48" IPS (1)(2)	48.000"	58.7"	26.2"	661.4 lbs.	200351	

(1) Dual fusion zones

(2) Requires the I Fuse 105 EF Processor for fusion

PolyPipe® for POTABLE WATER

PW PE3408/PE4710

High Performance Pipe for Potable Water Service

FEATURES:

- Suitable applications include Potable Water, Reclaim Water, Intake Water, Raw Water and Waste Water
- Heat-fused, fully restrained, leak proof joints
- Maintains optimum flow rates due to resistance to corrosion & biological growth
- Fatigue resistant
- NSF-61 & NSF-14 certified
- Meets ASTM D3350 cell classification PE445574C
- Material grades PE3408/PE4710/PE100 per PPI TR-4
- AWWA C901 / ASTM D3035 & AWWA C906 / ASTM F714

SAMPLE PRINTLINE:	12 '' IPS - SDR 11 - DURALINE-POLYPIPE®PW - PE3408 - AWWA C906-PC160-PE4710-ASTM F714-200PSI - (Resin Code)(Color Code) - 1GA - (ddmmmyy) - NSF-61
APPLICATION:	Potable Water Service & applications such as Mining, Landfill, Dredging, Water Reclamation or Wastewater
SIZE RANGE:	½" – 65" (IPS, DIPS)
COLOR/STRIPE:	Solid black, or with Stripes: blue, green, purple

PolyPipe is manufactured with high performance resins engineered with outstanding resistance to Slow Crack Growth (SCG) and Rapid Crack Propagation (RCP). The fatigue resistance of these resins improves design life in water systems where cyclic pressure surges exist.

Dura-Line is ISO 9001 certified and PolyPipe is qualified using exacting laboratory procedures and test methods, and a consistent uncompromised quest for design and manufacturing excellence.

PolyPipe® for POTABLE WATER

PW PE3408/PE4710

TYPICAL PHYSICAL PROPERTIES

PROPERTY	ASTM TEST METHOD	*NOMINAL VALUES	
		SI Units	English Units
Density, Natural	D1505	0.949 gm/cc	–
Density, Black	D1505	0.960 gm/cc	–
Melt Index (190°C/2.16 kg)	D1238	0.08 gm/10 min.	–
Flow Rate (190°C/21.6 kg)	D1238	7.5 gm/10 min.	–
Tensile Strength @ Yield	D638	24.8 MPa	3,500 psi
Ultimate Elongation	D638	>800%	>800%
Flexural Modulus 2% Secant	D790	1,034 MPa	150,000 psi
Environmental Stress Crack Resistance (ESCR)			
F_0, Condition C	D1693	--	--
PENT	F1473	>500 hrs.	>500 hrs.
Brittleness Temperature	D746	<-117°C	<-180°F
Hardness, Shore D	D2240	64	64
Vicat Softening Temperature	D1525	124°C	255°F
Izod Impact Strength (Notched)	D256	0.42 KJ/m	8 ft – lb_f/in
Volume Resistivity	D991	$>10^{15}$ ohm-cm	--
Thermal Expansion Coefficient		$2x10^{-4}$ cm/cm/°C	$1.0x10^{-4}$ in/in/°F
CELL CLASSIFICATION:	D3350	445574C	PE47
		445576C	PE100
PPI HYDROSTATIC DESIGN BASIS (HDB)	D2837	11.0 MPa @ 23°C	1,600 psi @ 73.4°F
(As listed in PPI TR-4)		6.9 MPa @ 140°C	1,000 psi @ 140°F
PPI HYDROSTATIC DESIGN STRESS (HDS)		6.9 MPa @ 23°C	1,000 psi @ 73.4°F
(As established by the Hydrostatic Stress Board (HSB) of the Plastics Pipe Institute (PPI))			

*Nominal values are intended to be guides only, and not as specification limit.

*Some of the data listed above was determined from compression molded test specimens; therefore, may deviate from pipe specimens.

PolyPipe®

PE3408/PE4710/PE100 Pipe
Pipe Data and Pressure Ratings - IPS

Pressure Rating		DR7 335 psi		DR9 255 psi		DR11 200 psi		DR13.5 160 psi		DR17 125 psi		DR21 100 psi		DR26 80 psi		DR32.5 65 psi	
Nominal Pipe Size	OD (inches)	Min. Wall (inches)	Weight (lbs/ft)	Min. Wall (inches)	Weight (lbs/ft)	Min. Wall (inches)	Weight (lbs/ft)	Min. Wall (inches)	Weight (lbs/ft)	Min. Wall (inches)	Weight (lbs/ft)	Min. Wall (inches)	Weight (lbs/ft)	Min. Wall (inches)	Weight (lbs/ft)	Min. Wall (inches)	Weight (lbs/ft)
½"	0.840	0.120	0.119	0.093	0.096	0.076	0.080	–	–	–	–	–	–	–	–	–	–
¾"	1.050	0.150	0.185	0.117	0.150	0.095	0.126	–	–	–	–	–	–	–	–	–	–
1"	1.315	0.188	0.291	0.146	0.235	0.120	0.197	–	–	–	–	–	–	–	–	–	–
1 ¼"	1.660	0.237	0.463	0.184	0.374	0.151	0.314	0.123	0.261	–	–	–	–	–	–	–	–
1 ½"	1.900	0.271	0.607	0.211	0.490	0.173	0.411	0.141	0.342	–	–	–	–	–	–	–	–
2"	2.375	0.339	0.948	0.264	0.766	0.216	0.642	0.176	0.534	0.140	0.431	–	–	–	–	–	–
3"	3.500	0.500	2.058	0.389	1.664	0.318	1.395	0.259	1.159	0.206	0.936	0.167	0.768	0.135	0.626	–	–
4"	4.500	0.643	3.402	0.500	2.751	0.409	2.306	0.333	1.916	0.265	1.548	0.214	1.269	0.173	1.035	0.138	0.835
5"	5.375	0.768	4.854	0.597	3.925	0.489	3.289	0.398	2.733	0.316	2.208	0.256	1.810	0.207	1.477	0.165	1.192
5"	5.563	0.795	5.199	0.618	4.204	0.506	3.523	0.412	2.928	0.327	2.366	0.265	1.939	0.214	1.582	0.171	1.277
6"	6.625	0.946	7.374	0.736	5.963	0.602	4.997	0.491	4.152	0.390	3.355	0.315	2.750	0.255	2.244	0.204	1.811
7"	7.125	1.018	8.529	0.792	6.897	0.648	5.780	0.528	4.802	0.419	3.881	0.339	3.181	0.274	2.596	0.219	2.094
8"	8.625	1.232	12.498	0.958	10.106	0.784	8.470	0.639	7.037	0.507	5.687	0.411	4.662	0.332	3.804	0.265	3.069
10"	10.75	1.536	19.416	1.194	15.700	0.977	13.157	0.796	10.932	0.632	8.834	0.512	7.242	0.413	5.909	0.331	4.767
12"	12.75	1.821	27.312	1.417	22.085	1.159	18.508	0.944	15.379	0.750	12.427	0.607	10.187	0.490	8.312	0.392	6.703
14"	14.00	2.000	32.930	1.556	26.628	1.273	22.315	1.037	18.542	0.824	14.983	0.667	12.282	0.538	10.022	0.431	8.086
16"	16.00	2.286	43.010	1.778	34.779	1.455	29.146	1.185	24.218	0.941	19.569	0.762	16.042	0.615	13.090	0.492	10.561
18"	18.00	2.571	54.435	2.000	44.017	1.636	36.888	1.333	30.651	1.059	24.767	0.857	20.304	0.692	16.567	0.554	13.366
20"	20.00	2.857	67.203	2.222	54.342	1.818	45.541	1.481	37.840	1.176	30.577	0.952	25.066	0.769	20.453	0.615	16.501
22"	22.00	–	–	2.444	65.754	2.000	55.105	1.630	45.787	1.294	36.998	1.048	30.330	0.846	24.748	0.677	19.967
24"	24.00	–	–	2.667	78.253	2.182	65.579	1.778	54.490	1.412	44.031	1.143	36.095	0.923	29.452	0.738	23.762
28"	28.00	–	–	3.111	106.51	2.545	89.260	2.074	74.167	1.647	59.931	1.333	49.130	1.077	40.087	0.862	32.342
30"	30.00	–	–	3.333	121.63	2.727	102.467	2.222	85.141	1.765	68.798	1.429	56.399	1.154	46.019	0.923	37.128
32"	32.00	–	–	3.556	139.12	2.909	116.59	2.370	96.871	1.882	78.277	1.524	64.169	1.231	52.359	0.985	42.243
36"	36.00	–	–	4.000	176.07	3.273	146.78	2.667	121.96	2.118	99.069	1.714	81.214	1.385	66.267	1.108	53.464
42"	42.00	–	–	–	–	–	–	3.111	166.88	2.471	134.844	2.000	110.542	1.615	89.73	1.292	72.771
48"	48.00	–	–	–	–	–	–	–	–	2.824	176.122	2.286	144.381	1.846	117.808	1.477	95.047
54"	54.00	–	–	–	–	–	–	–	–	3.176	222.91	2.571	182.732	2.077	149.100	1.662	120.294
63"	63.00	–	–	–	–	–	–	–	–	3.706	303.398	3.000	248.72	2.423	202.94	1.938	163.73
65"	65.00	–	–	–	–	–	–	–	–	3.824	322.967	3.095	264.76	2.500	216.03	2.000	174.29

dura-line

*See notes on Page 4 for product and pressure rating information

PolyPipe®

PE3408/PE4710/PE100 Pipe
Pipe Data and Pressure Ratings - DIPS

Pressure Rating		DR7 335 psi		DR9 255 psi		DR11 200 psi		DR13.5 160 psi		DR17 125 psi		DR21 100 psi		DR26 80 psi		DR32.5 65 psi	
Nominal Pipe Size	OD (inches)	Min. Wall (inches)	Weight (lbs/ft)	Min. Wall (inches)	Weight (lbs/ft)	Min. Wall (inches)	Weight (lbs/ft)	Min. Wall (inches)	Weight (lbs/ft)	Min. Wall (inches)	Weight (lbs/ft)	Min. Wall (inches)	Weight (lbs/ft)	Min. Wall (inches)	Weight (lbs/ft)	Min. Wall (inches)	Weight (lbs/ft)
3"	3.96	0.566	2.635	0.440	2.130	0.360	1.785	0.293	1.483	0.233	1.199	0.189	0.983	0.152	0.802	0.122	0.647
4"	4.80	0.686	3.871	0.533	3.130	0.436	2.623	0.356	2.180	0.282	1.761	0.229	1.444	0.185	1.178	0.148	0.950
6"	6.90	0.986	7.999	0.767	6.468	0.627	5.421	0.511	4.504	0.406	3.639	0.329	2.984	0.265	2.434	0.212	1.964
8"	9.05	1.293	13.760	1.006	11.127	0.823	9.325	0.670	7.748	0.532	6.261	0.431	5.132	0.348	4.188	0.278	3.379
10"	11.10	1.586	20.700	1.233	16.739	1.009	14.028	0.822	11.656	0.653	9.418	0.529	7.721	0.427	6.300	0.342	5.083
12"	13.20	1.886	29.274	1.467	23.671	1.200	19.838	0.978	16.483	0.776	13.319	0.629	10.919	0.508	8.909	0.406	7.188
14"	15.30	2.186	39.329	1.700	31.802	1.391	26.652	1.133	22.145	0.900	17.894	0.729	14.669	0.588	11.969	0.471	9.657
16"	17.40	2.486	50.866	1.933	41.132	1.582	34.470	1.289	28.641	1.024	23.144	0.829	18.973	0.669	15.481	0.535	12.490
18"	19.50	2.786	63.885	2.167	51.659	1.773	43.292	1.444	35.972	1.147	29.067	0.929	23.829	0.750	19.443	0.600	15.687
20"	21.60	3.086	78.386	2.400	63.385	1.964	53.119	1.600	44.137	1.271	35.665	1.029	29.237	0.831	23.856	0.665	19.247
24"	25.80	–	–	2.867	90.431	2.345	75.785	1.911	62.970	1.518	50.883	1.229	41.713	0.992	34.035	0.794	27.460
30"	32.00	–	–	–	–	–	–	2.370	96.871	1.882	78.277	1.524	64.169	1.231	52.359	0.985	42.243
36"*	38.30	–	–	–	–	–	–	–	–	2.253	112.132	1.824	91.923	1.473	75.005	1.178	60.514
42"*	44.50	–	–	–	–	–	–	–	–	2.618	151.374	2.119	124.093	1.712	101.254	1.369	81.692
48"*	50.80	–	–	–	–	–	–	–	–	–	–	2.419	161.717	1.954	131.953	1.563	106.460
54"*	57.56	–	–	–	–	–	–	–	–	–	–	2.741	207.620	2.214	169.408	1.771	136.678
60"*	61.61	–	–	–	–	–	–	–	–	–	–	–	–	2.370	194.086	1.896	156.588

PolyPipe® Potable Water PE4710 Pipe is manufactured in accordance with the following standards:

- For sizes ½" IPS through 3" IPS products are manufactured in accordance with ASTM D3035 & AWWA C901.
- For sizes 4" IPS through 60" DIPS products are manufactured in accordance with ASTM F714 & AWWA C906.
- Metric sizes also available.
- Coiled pipe available through 6" OD and straight lengths available in 40' and 50' lengths. For custom lengths, contact a Customer Service Representative.

- Pressures are based on water at 23°C (73.4°F) and are determined by use of the Hydrostatic Design Stress (HDS) as established by the Hydrostatic Stress Board (HSB) of the Plastics Pipe Institute (PPI).
- The above weights for IPS and DIPS sizes are calculated in accordance with Plastics Pipe Institute (PPI) TR-7, using a value of 0.960 for density.
- Available with color-coded striping.
- Some sizes listed are special order. Call for availability on sizes.
- *May require additional lead time.

Pea Gravel Quarry Certification

ROGERS
Ready-Mix & Materials
INC.

	Ready Mix	Materials	Fax	
Rockford	874-6626	874-2121	874-4205	Toby A. Rogers, President
Byron	234-8212	234-8044	234-2927	Robert A. Rogers, Vice President
Rochelle	562-4267	562-4267	562-6049	
Roscoe	389-2223	389-2223	389-9292	

To Whom It May Concern:

All limestone and sand & gravel products are naturally occurring, virgin materials that are mined from deposits that have been existing on site for millions of years. We hereby certify that the material supplied on this project came from inspected stockpiles and that this material was produced to meet the requirements of section 1004 of the "Standard Specifications to Road and Bridge Construction", dated April 1, 2016. This document is published by the Illinois Department of Transportation Division of Highways.

020CA16 Pea Gravel

Please accept this letter as certification that the material delivered qualifies for the above mentioned specification.

Thank you for your request. If I may be of further assistance, please feel free to contact me.

Ben Newman

Quality Control Department

United Association

Certification Programs
Certificate of Qualifications

AARON M MCCOLLOM
ID:001581716 Local:023

Training records available upon request.

Mark McManus
General President

Cert Type	Certified	Expires	Process
WELDER	07/28/2015	No Expiration	BCW
WELDER	03/20/2019	09/20/2019	GTAW MANUAL
WELDER	03/20/2019	09/20/2019	SMAW MANUAL

Weld Test Codes: UA-P1, P2, 22, 21

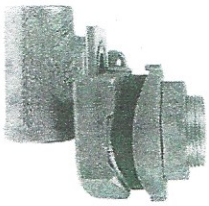
ASME Section IX and AWS D1.1, stipulate that the above listed groove weld tests also qualify the welder to make any size fillet welds on all material thicknesses, all pipe diameters, and all positions.

Fusionist Certification

ATTACHMENT 2

dicken™ PITLESS ADAPTERS

MADE in the USA



Features:
- Precision machined all red brass castings with neoprene O-ring
- Large inner and outer rubber gaskets to seal out surface water contamination
- All Dicken pitless adapters are pressure tested to 150 psi
- Chamfered slide for fast and easy installation
- Wrench grip on ell speeds installation
- A built in lowering eyelet for easier installation
- Water System Council - PAS-97 (2012) listed
- Lead Free: ≤ .025% Lead Content

Part Number	Model	Discharge Pipe (Inches)	Supply Pipe (Inches)	Casing Size (Inches) I.D.	Hole Size Required (Inches)	Shipping Weight (lbs-oz.)	Working Load (lbs.)	Quantity/ /Carton
952156	JR-S-10	1	1	4-1/2 to 12	1 5/8	2 lbs. 5 oz.	1500	12
952158	*JR-S-10-P	1	1	4-1/2 to 12	1 5/8	2 lbs. 5 oz.	1500	12
952110	LD-S-10	1	1	5 to 12	1-3/4	4 lbs. 2 oz.	2000	12
952160	*LD-S-10-P	1	1	5 to 12	1-3/4	4 lbs. 3 oz.	2000	12
952112	LD-S-12	1-1/4	1-1/4	5 to 12	2-1/4	5 lbs. 8 oz.	2000	8
952162	LD-S-12-P	1-1/4	1-1/4	5 to 12	2 -1/4	5 lbs. 9 oz.	2000	8
952010	S-10	1	1	5 to 12	1-3/4	5 lbs.13 oz.	5000	8
952012	S-12	1-1/4	1-1/4	5 to 12	2-1/4	8 lbs. 2 oz.	5000	6
952015	S-15	1-1/2	1-1/2	5-3/16 to 12	2-5/8	10 lbs.12 oz.	5000	6
952016	S-15P	1-1/2	1-1/2	5-3/16 to 12	2-5/8	10 lbs.12 oz.	5000	6
952020	S-20	2	2	5-5/8 to 12	3-1/8	14 lbs. 4 oz	5000	4
952150	LD-2-X upper LD-2-X lower	1-1/4 1	1-1/4 1	4-1/2 to 12	2-1/4 1-3/4	11 lbs. 9 oz.	2000	6

- **Pressurized model available for counties and states where required.**
- **JR-S-10 may be used on 4" casing with 3" pump.**
- **NOTE: Part Number 952015 Model S-15 not designed for STR17 5" PVC casing.**

CLEARWAY PITLESS ADAPTER | Patented

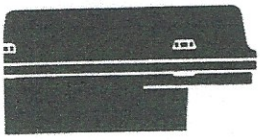
Features:
- Simple slip fit insert
- Easy installation by cutting 2 3/4" hole and clamping on
- Clamp on units for no obstruction in well casing ID
- Lead Free: ≤ .025% Lead Content

Part Number	Model	Discharge Pipe (Inches)	Supply Pipe (Inches)	Casing Size (Inches) I.D./O.D.		Hole Size Required (Inches)	Shipping Weight (lbs-oz.)	Working Load (lbs.)	Quantity /Carton
952040	CW-4-10	1	1	4	4-1/2	2-3/4	5 lbs. 1 oz.	2000	6
952050	CW-5-10	1	1	4-1/2 5	5 5-9/16	2-3/4	5 lbs. 0 oz.	2000	6
952060	CW-6-10	1	1	6	6-5/8	2-3/4	5 lbs. 14 oz.	2000	6
952045	CW-4-10-WA	1	1	4	4-1/2	2-3/4	6 lbs. 0 oz.	2000	6
952047	CW-4.5-10-WA	1	1	4-1/2	5	2-3/4	6 lbs. 8 oz.	2000	6
952055	CW-5-10-WA	1	1	5	5-9/16	2-3/4	6 lbs. 8 oz.	2000	6
952065	CW-4-12-WA	1-1/4	1-1/4	4	4-1/2	2-3/4	6 lbs. 5 oz.	2000	6
952066	CW-4.5-12-WA	1-1/4	1-1/4	4-1/2	5	2-3/4	6 lbs. 12 oz.	2000	6
952067	CW-5-12-WA	1-1/4	1-1/4	5	5-9/16	2-3/4	6 lbs. 5 oz.	2000	6
952058	CW-6-12-WA	1-1/4	1-1/4	6	6-5/8	2-3/4	6 lbs. 15 oz.	2000	6

WELLS, INC. 6" Well Caps

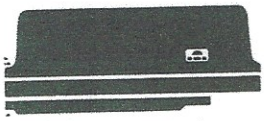
ATTACHMENT 3

2-PIECE WATERTIGHT WELL CAP (SC/SCP STYLE)



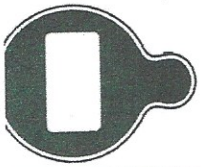
Part	Nominal Well Size	Casing O.D.	Conduit Connection	Master Carton	Technical Notes
SC6	6"	6 5/8"	1" NPT	12	• 2 piece cap - aluminum top, ABS, bottom ring with 1" conduit connection for 6" I.D. (6 5/8" O.D.) PVC well casing only. • Can be solvent welded to casing • S.S. nuts, bolts, and screened vent. • Grounding screw and eye available • For use in most states • Model SC6-ATW for at the well contr
SC 6.9	6"-6 1/4"	6.9"	1" NPT	12	• Identical to SC6 except for 6.9" O.D. casing
SCP6	6"	6 5/8"	1" NPT	12	• Identical to SC6 except top is thermoplastic instead of aluminum
SCP6.9	6"-6 1/4"	6.9"	1" NPT	12	• Identical to SCP6 except for 6.9" O.D. Casing
SCC6	6"	6 5/8"	1" NPT	12	• Identical to SC6 except bottom is a clamp on thermoplastic composite ring for use on steel casing
SCPC6	6"	6 5/8"	1" NPT	12	• Identical to SCC6 except top is thermoplastic instead of aluminum

3-PIECE WATERTIGHT WELL CAP WC/WCP STYLE)



WC6	6"	6 5/8"	1" NPT	12	• 3 piece cap - all aluminum with 1" conduit connection for 6" I.D (6 5/8" O.D.) steel or plastic well casing. • S.S. nuts, bolts, and screened vent • Grounding screw and eye available • For use in most states • Model WC6-ATW for at the well contr
WCP6	6"	6 5/8"	1" NPT	12	• Identical to WC6 except for top is thermoplastic instead of aluminum

1-PIECE ALUMINUM WELL CAP (C-STYLE)



C6	6"	6 5/8"	1" NPT	12	• one piece aluminum cap for 1" conduit connection for 6" I.D. (6 5/8" O.D.) steel or plastic well casing

1-PIECE ALUMINUM WELL CAP (J-STYLE)

J6	6"	6 5/8"	1" NPT	12	• One piece round aluminum cap for jet pump installations in 6" I.D. (6 5/8" O.D.) steel or plastic well casing

NOTE: Free imprinted aluminum name plates (choice of riveted-on or adhesive-backed) for all well caps except J style.

ATTACHMENT 4

K & E

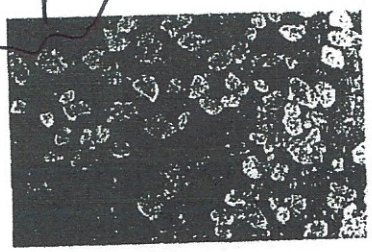
WP Silica Sands

OR WELL GRAVELS

Typical Sand Distribution % retained on Screen						
	WP #3	WP #2	WP #1	WP #0	WP #00N	
Seive Size	6X12	8X16	12X20	16X30	20X40	
6	1					
8	39	1				
12	54	48	2			
16	5	45	60	1		
20	1	5	33	47	1	
30		1	4	45	39	
40			1	6	57	
50				1	3	
Effective Size.	1.6-20	1.0-1.5	0.8-1.2	0.6-0.8	0.4-0.55	

WP Typical Chemical Characteristics

SiO2	99.39 %
Fe2O3	.24 %
Al2O3	.19%
TiO2	.12 %
CaO	.01 %
MgO	.004 %
L.O.I.	.05 %



WP Sand Magnified

Typical Physical Characteristics

Name: WP Sandblasting Sand
Specific Gravity: 2.55 to 2.70
Acid Solubility: .1 %
Porosity: 38 - 46 %
Color: Light Tan
Hardness (MOH): 7
Grain Shape: Round to Sub Angular
UC < 1.5

Product Advantages

Passes all AWWA specifications for filtering materials. B100 Spec
Passes NSF Standard 61

K&E Sand and Gravel, P.O. Box 369, Wyoming, Ontario. N0N 1T0
Phone (519) 845-3396 FAX: (519) 845-3398

ATTACHMENT 5

EDAC

Environmental Drilling and Contracting Inc.
2700 S. Getty St., Muskegon, MI 49444 (231)733-9300

STATEMENT OF QUALIFICATION

EDAC, INC.

ENVIRONMENTAL DRILLING AND CONTRACTING, INC.

2700 S. Getty St.

Muskegon, MI 49444

Telephone: (231) 733-9300

email: <edac@tds.net>

Sean Smith, President

Union Affiliation: International Union of Operating Engineers, Local 150

Started Business: November 1989

Drilling Methods/Capability:

Hollow Stem Auger: 4 1/4" I.D. 0 - 300 Feet
8 1/4" I.D. 0 - 180 Feet
12 1/4" I.D. 0 - 80 Feet

Mud Rotary: 3 7/8" O.D. - 20 " O.D. Drill Bits
Depth Range: 0 - 500 Feet

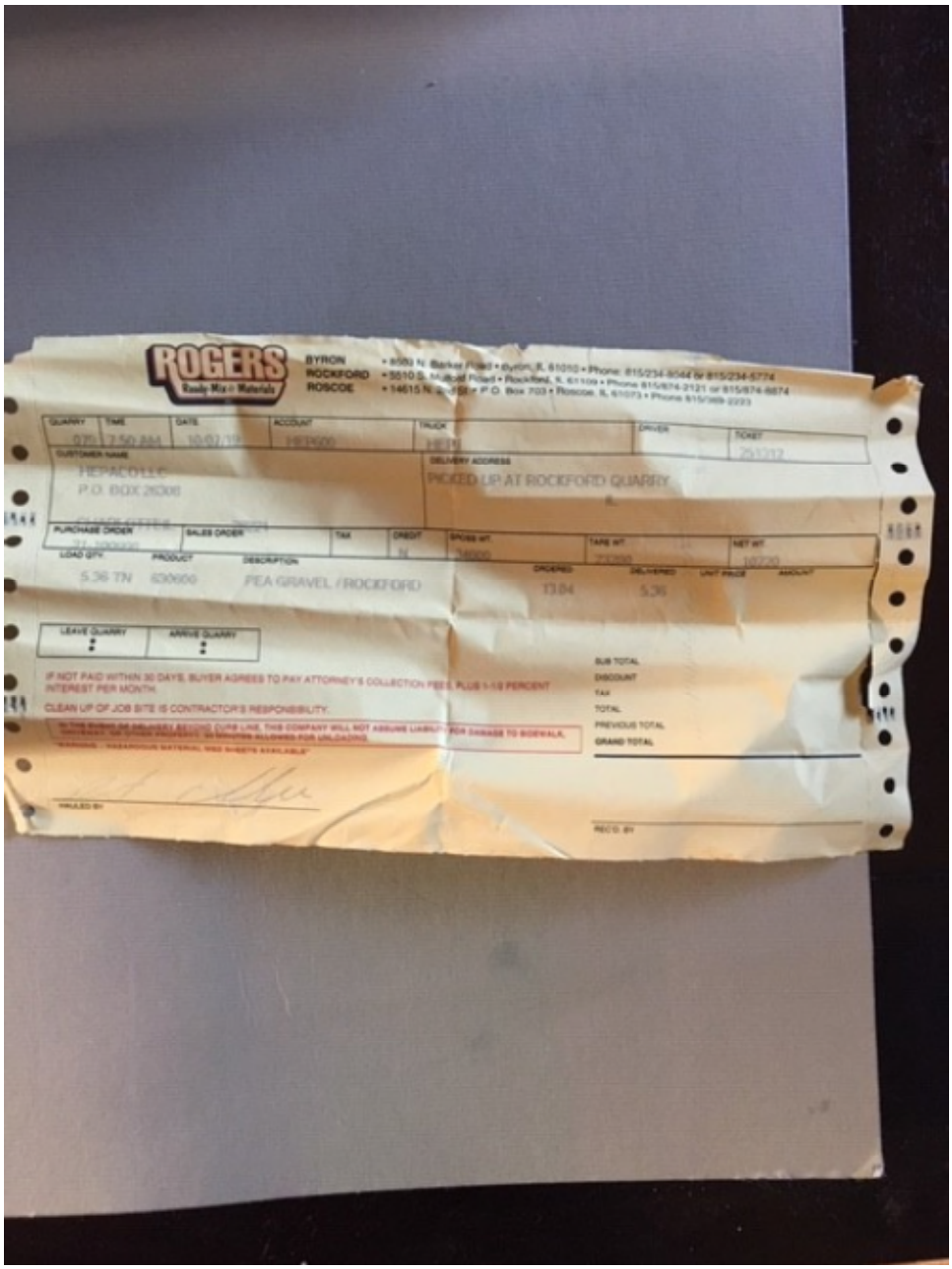
Special Tooling: 3" full hole rod using mud rotary sampling through rod using 2" split spoon
4 1/4" full hole rod using mud rotary sampling through rod using 3" split spoon & hydro punch water sampler

Air Rotary: 3 7/8" O.D. - 8" O.D. Drill Bits
Depth Range: 0 - 400 Feet

Equipment List: 2 each, Gus Pech GP1300 ATV Drill Rig
1 each, Gus Pech GP750 Mite-e-Mite low mast (11') Drill Rig

Drillers License: Michigan, Ohio, Illinois & Indiana

Number of Employees: 6 Total
1 - President/Owner
1 - Estimator/Project Coordinator
2 - Drillers
2- Driller Helpers



TICKET FOR PEA GRAVEL

LBA™

LIQUID BIO-FOULING AGENT

Certified to NSF/ANSI 60

DESCRIPTION

A liquid, LBA is certified by NSF International. LBA is certified to NSF/ANSI Standard 60, Drinking Water Treatment Chemicals - Health Effects.

RECOMMENDED USE

LBA cleans casings, screens, and all other components of the well that are affected by bio-fouling or iron bacteria.

CHARACTERISTICS

- LBA acts as a chelating agent, allowing more dissolved minerals to be pumped to waste, therefore preventing re-depositing of the minerals
- LBA has the ability to penetrate and disperse debris layers
- LBA is also used to debris fouling of environmental monitoring and recovery wells, oil/water separators, air strippers, and other types of equipment used in groundwater remediation
- LBA is non-corrosive and nontoxic

DIRECTIONS FOR USE

1. Test well pH before starting treatment. Disconnect distribution system.
2. Calculate quantity of LBA by using the Dosage Table. Normal dosage is 5-7% solution. If gravel pack is present, the volume of water in it should be accounted for as part of the total well volume (typical porosity of gravel pack is 30-40%).
3. Add LBA directly into the well through the casing. Agitate the well for 12-48 hours by surging, jetting, or circulating the water. Compressed air may be used to agitate the well.
4. Upon completing agitation, DPA can be added to the well if mineral encrustation is present.
5. Pump the well until water is clean and free of acid to within 0.5 units of original pH. Reinstall pumping equipment.
6. Chlorinate the well with a shock treatment of sodium hypochlorite at 500 to 1,000 ppm. Pump the well until clear of chlorine.

PACKAGING

5 gallon pail, 27 or 28 per pallet, 15 gallon pail, 8 per pallet, or 55 gallon drum, 4 per pallet. All pallets are plastic-wrapped.

LBA DOSAGE TABLE (5% SOLUTION)

WELL DIAMETER	GAL/10 FT OF WATER
2”	0.08
4”	0.33
6”	0.74
8”	1.31
10”	2.05
12”	2.95
14”	4.02
16”	5.25
18”	6.64
20”	8.20
24”	11.81
28”	16.07

North America: 847.851.1800 | 800.527.9948 | www.CETCO.com

UPDATED: JULY 2015

FORM: TDS_LBA_AM_EN_201507

APPENDIX C

SURVEY DATA

Appendix C

ODC Well Elevations

Recorded on October 23, 2019

Station Location	Top of Steel Casing Elev. (ft)	Top of PVC casing Elevation (ft)	*Ground surface Elevation* (ft)
OMC-EW-01	590.11	589.51-T Plate	590.11
EW-01 PZ	590.11	589.53	590.11
EW-02R	591.05	590.64	591.05
EW-02RPZ	591.05	590.89-T/Gasket	591.05
PZ-3	587.59	587.42	587.59
PZ-4	586.71	586.42-T/Gasket-E	586.45--W pvc
PZ-7	587.85	587.72-N(587.41-S)	587.85
PZ-8	585.82	585.43	585.82

* Ground flush wells, elevation taken on Easterly Rim

* T/steel casing on stick wells, elevation taken on latch side (typ.)

T/casing elevation taken on T/PVC, unless noted otherwise.

Horizontal Datum: NAD 83 (IL. ST. Plane Coords. East)

Vertical Datum: NAVD 88

Field Work Completed on: 10/23/19 TM, JP

APPENDIX D

MANIFESTS

013863233FLE

Please print or type.

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
	ILD 000 802 827	1	(312) 287-4440 Adam McNamara	013863233 FLE

5. Generator's Name and Mailing Address
OMC PLANT 2/ USEPA
77 W. JACKSON BOULEVARD
ATTEN: TIM DREXLER
SR- 6J CHICAGO, IL 60604
Generator's Phone: (847) 689-6200

Generator's Site Address (if different than mailing address)
90 E. SEA HORSE DRIVE
WAUKEGAN, IL 60085

6. Transporter 1 Company Name
EQ Industrial Services 1/14/04
U.S. EPA ID Number
MIK 435642742

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
WAYNE DISPOSAL, INC. SITE #2 LANDFII
49350 N I-94 SERVICE DRIVE
BELLEVILLE, MI 48111
Facility's Phone: (800) 592-5489
U.S. EPA ID Number
MID 048 090 633

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. UN3432, Polychlorinated biphenyls, solid, 9, PGII, ERG #171	005	BA	10,000	P	PCB6
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
1. J198116WDI / PCB CONTAMINATED SOIL

SSD: 10-18-2019 TD#: 001-005

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Sarah Holtes, RPM, U.S. EPA
Signature: , USEPA
Month: 11 Day: 26 Year: 19

GENERATOR

INTL
16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER
17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Jeff Adams
Signature:
Month: 11 Day: 26 Year: 19
Transporter 2 Printed/Typed Name:
Signature:
Month: Day: Year:

DESIGNATED FACILITY
18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☒ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:
18c. Signature of Alternate Facility (or Generator) Month: Day: Year:
19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H132 2. 3. 4.
20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Walt Schaefer
Signature:
Month: Day: Year:

EPA Form 8700-22 (Rev. 12-17) Previous editions are obsolete.

DESIGNATED FACILITY TO GENERATOR

863882

Form Approved. OMB No. 2050-0039

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
ILD000802827	1	800-288-7689	018363329 JJK

5. Generator's Name and Mailing Address: US EPA Region 5, 77 West Jackson Blvd, Chicago IL 60604

Generator's Site Address (if different than mailing address): 90 E. SEA Horse Drive, N. Waukegan IL 60085

Generator's Phone: 312-886-6551

6. Transporter 1 Company Name: HEPACO LLC — U.S. EPA ID Number: NCD 986194306

7. Transporter 2 Company Name: Veolia ES Technical Solutions — U.S. EPA ID Number: NJD080631369

8. Designated Facility Name and Site Address: Veolia ES Technical Solutions, Highway 73, 3.5 miles W. of Taylor's Bayo, Port Arthur, TX 77640 — U.S. EPA ID Number: TXD000986194306

Facility's Phone: 409-736-2721

9a HM	9b U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. UN2315, Polychlorinated Biphenyls, Liquids, 9, PGII, Marine Pollutant	8	DR	1,790 400	KG	IL
	2.					
	3.					
	4.					

RB Abolish

14. Special Handling Instructions and Additional Information

W: 740730

A: PTA 740730

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent. I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Sarah Bolles, RPM, U.S. EPA — Signature: [signature] on behalf — USEPA — Month: 02 — Day: 11 — Year: 2020

16. International Shipments: ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit: ____ Date leaving U.S.: ____

Transporter signature (for exports only):

17. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Dale Luttrell — Signature: [signature] — Month: 02 — Day: 20 — Year: 2020

Transporter 2 Printed/Typed Name: Randy E. Buck — Signature: [signature] — Month: 2 — Day: 20 — Year: 20

18. Discrepancy

18a. Discrepancy Indication Space: ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number:

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month: — Day: — Year:

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H040			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a

Printed/Typed Name: Tiffany Castleman — Signature: Tiffany Castleman — Month: 3 — Day: 17 — Year: 20

GENERATOR — TRANSPORTER — DESIGNATED FACILITY

*20 03 20

EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

Please print or type.

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST (Continuation Sheet)	21. Generator ID Number	22. Page	23. Manifest Tracking Number
	ILD 000802827	2	019363329 JJK

24. Generator's Name: US EPA REGION E

25. Transporter 3 Company Name: BASIN TRANSPORTATION — U.S. EPA ID Number: OKR000031492

26. Transporter ____ Company Name — U.S. EPA ID Number

27a. HM	27b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	28. Containers No.	28. Containers Type	29. Total Quantity	30. Unit Wt./Vol.	31. Waste Codes
	TRANSPORTATION					
	USE ONLY					
	001943					

32. Special Handling Instructions and Additional Information

GENERATOR

TRANSPORTER

33. Transporter 3 Acknowledgment of Receipt of Materials
Printed/Typed Name: Dennis Rogers — Signature: Dennis Rogers — Month: 3 — Day: 13 — Year: 20

34. Transporter ____ Acknowledgment of Receipt of Materials
Printed/Typed Name ____ Signature ____ Month ____ Day ____ Year ____

DESIGNATED FACILITY

35. Discrepancy

36. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

EPA Form 8700-22A (Rev. 12-17) Previous editions are obsolete.

DESIGNATED FACILITY TO EPA's e-MANIFEST SYSTEM

ATTACHMENT 1

LABORATORY ANALYTICAL REPORT FOR IMPORTED TOPSOIL

First Environmental Laboratories, Inc.
IL ELAP / NELAC Accreditation # 100292
1600 Shore Road • Naperville, Illinois 60563 • Phone (630) 778-1200 • Fax (630) 778-1233

September 10, 2019

Mr. Jeff Lonas
HEPACO, LLC.
8184 Starwood Drive
Loves Park, IL 61111

Project ID: 1932.1019 PO# 31-100560
First Environmental File ID: 19-5304
Date Received: August 30, 2019

Dear Mr. Jeff Lonas:

The above referenced project was analyzed as directed on the enclosed chain of custody record.

All Quality Control criteria as outlined in the methods and current IL ELAP/NELAP have been met unless otherwise noted. QA/QC documentation and raw data will remain on file for future reference. Our accreditation number is 100292 and our current certificate is number 1002922019-1: effective 08/22/2019 through 02/28/2020.

I thank you for the opportunity to be of service to you and look forward to working with you again in the future. Should you have any questions regarding any of the enclosed analytical data or need additional information, please contact me at (630) 778-1200.

Sincerely,

W. Mottashed

Bill Mottashed
Project Manager

First Environmental Laboratories, Inc.
IL ELAP / NELAC Accreditation # 100292
1600 Shore Road • Naperville, Illinois 60563 • Phone (630) 778-1200 • Fax (630) 778-1233

Case Narrative

HEPACO, LLC.

Lab File ID: **19-5304**

Project ID: **1932.1019 PO# 31-100560**

Date Received: **August 30, 2019**

All quality control criteria, as outlined in the methods, have been met except as noted below or on the following analytical report.

The results in this report apply to the samples in the following table:

Laboratory Sample ID	Client Sample Identifier	Date/Time Collected
19-5304-001	Topsoil-Shop	8/26/2019 9:00

Sample Batch Comments:

Method 5035 vials for soil VOCs were not received. Samples preserved in lab.

First Environmental Laboratories, Inc.
IL ELAP / NELAC Accreditation # 100292
1600 Shore Road • Naperville, Illinois 60563 • Phone (630) 778-1200 • Fax (630) 778-1233

Case Narrative

HEPACO, LLC.

Lab File ID: **19-5304**

Project ID: **1932.1019 PO# 31-100560**

Date Received: **August 30, 2019**

All quality control criteria, as outlined in the methods, have been met except as noted below or on the following analytical report.

The following is a definition of flags that may be used in this report:

Flag	Description	Flag	Description
A	Method holding time is 15 minutes from collection. Lab analysis was performed as soon as possible.		
B	Analyte was found in the method blank.	L	LCS recovery outside control limits.
<	Analyte not detected at or above the reporting limit.	M	MS recovery outside control limits; LCS acceptable.
C	Sample received in an improper container for this test.	P	Chemical preservation pH adjusted in lab.
D	Surrogates diluted out; recovery not available.	Q	Result was determined by a GC/MS database search.
E	Estimated result; concentration exceeds calibration range.	S	Analysis was subcontracted to another laboratory.
G	Surrogate recovery outside control limits.	T	Result is less than three times the MDL value.
H	Analysis or extraction holding time exceeded.	W	Reporting limit elevated due to sample matrix.
J	Estimated result; concentration is less than routine RL but greater than MDL.	N	Analyte is not part of our NELAC accreditation or accreditation may not be available for this parameter.
RL	Routine Reporting Limit (Lowest amount that can be detected when routine weights/volumes are used without dilution.)	ND	Analyte was not detected using a library search routine; No calibration standard was analyzed.

First Environmental Laboratories, Inc.
IL ELAP / NELAC Accreditation # 100292
1600 Shore Road • Naperville, Illinois 60563 • Phone (630) 778-1200 • Fax (630) 778-1233

Analytical Report

Client: HEPACO, LLC.
Project ID: 1932.1019 PO# 31-100560
Sample ID: Topsoil-Shop
Sample No: 19-5304-001

Date Collected: 08/26/19
Time Collected: 9:00
Date Received: 08/30/19
Date Reported: 09/10/19

Results are reported on a dry weight basis.

Analyte	Result	R.L.	Units	Flags
Solids, Total **Method: 2540B**				
Analysis Date: 09/04/19				
Total Solids	90.74		%	
Volatile Organic Compounds **Method: 5035A/8260B**				
Analysis Date: 09/04/19				
Acetone	< 200	200	ug/kg	
Benzene	< 5.0	5.0	ug/kg	
Bromodichloromethane	< 5.0	5.0	ug/kg	
Bromoform	< 5.0	5.0	ug/kg	
Bromomethane	< 10.0	10.0	ug/kg	
2-Butanone (MEK)	< 100	100	ug/kg	
Carbon disulfide	< 5.0	5.0	ug/kg	
Carbon tetrachloride	< 5.0	5.0	ug/kg	
Chlorobenzene	< 5.0	5.0	ug/kg	
Chlorodibromomethane	< 5.0	5.0	ug/kg	
Chloroethane	< 10.0	10.0	ug/kg	
Chloroform	< 5.0	5.0	ug/kg	
Chloromethane	< 10.0	10.0	ug/kg	
1,1-Dichloroethane	< 5.0	5.0	ug/kg	
1,2-Dichloroethane	< 5.0	5.0	ug/kg	
1,1-Dichloroethene	< 5.0	5.0	ug/kg	
cis-1,2-Dichloroethene	< 5.0	5.0	ug/kg	
trans-1,2-Dichloroethene	< 5.0	5.0	ug/kg	
1,2-Dichloropropane	< 5.0	5.0	ug/kg	
cis-1,3-Dichloropropene	< 4.0	4.0	ug/kg	
trans-1,3-Dichloropropene	< 4.0	4.0	ug/kg	
Ethylbenzene	< 5.0	5.0	ug/kg	
2-Hexanone	< 10.0	10.0	ug/kg	
Methyl-tert-butylether (MTBE)	< 5.0	5.0	ug/kg	
4-Methyl-2-pentanone (MIBK)	< 10.0	10.0	ug/kg	
Methylene chloride	< 20.0	20.0	ug/kg	
Styrene	< 5.0	5.0	ug/kg	
1,1,2,2-Tetrachloroethane	< 5.0	5.0	ug/kg	
Tetrachloroethene	< 5.0	5.0	ug/kg	
Toluene	< 5.0	5.0	ug/kg	
1,1,1-Trichloroethane	< 5.0	5.0	ug/kg	
1,1,2-Trichloroethane	< 5.0	5.0	ug/kg	
Trichloroethene	< 5.0	5.0	ug/kg	

First Environmental Laboratories, Inc.
IL ELAP / NELAC Accreditation # 100292
1600 Shore Road • Naperville, Illinois 60563 • Phone (630) 778-1200 • Fax (630) 778-1233

Analytical Report

Client: HEPACO, LLC.
Project ID: 1932.1019 PO# 31-100560
Sample ID: Topsoil-Shop
Sample No: 19-5304-001

Date Collected: 08/26/19
Time Collected: 9:00
Date Received: 08/30/19
Date Reported: 09/10/19

Results are reported on a dry weight basis.

Analyte	Result	R.L.	Units	Flags
Volatile Organic Compounds **Method: 5035A/8260B**				
Analysis Date: 09/04/19				
Vinyl acetate	< 10.0	10.0	ug/kg	
Vinyl chloride	< 10.0	10.0	ug/kg	
Xylene, Total	< 5.0	5.0	ug/kg	
Semi-Volatile Compounds **Method: 8270C**		**Preparation Method 3540C**		
Analysis Date: 09/06/19		Preparation Date: 09/04/19		
Acenaphthene	< 330	330	ug/kg	
Acenaphthylene	< 330	330	ug/kg	
Anthracene	< 330	330	ug/kg	
Benzidine	< 330	330	ug/kg	
Benzo(a)anthracene	889	330	ug/kg	
Benzo(a)pyrene	1,110	90	ug/kg	
Benzo(b)fluoranthene	1,110	330	ug/kg	
Benzo(k)fluoranthene	1,120	330	ug/kg	
Benzo(ghi)perylene	1,070	330	ug/kg	
Benzoic acid	< 330	330	ug/kg	
Benzyl alcohol	< 330	330	ug/kg	
bis(2-Chloroethoxy)methane	< 330	330	ug/kg	
bis(2-Chloroethyl)ether	< 330	330	ug/kg	
bis(2-Chloroisopropyl)ether	< 330	330	ug/kg	
bis(2-Ethylhexyl)phthalate	< 330	330	ug/kg	
4-Bromophenyl phenyl ether	< 330	330	ug/kg	
Butyl benzyl phthalate	< 330	330	ug/kg	
Carbazole	< 330	330	ug/kg	
4-Chloroaniline	< 330	330	ug/kg	
4-Chloro-3-methylphenol	< 330	330	ug/kg	
2-Chloronaphthalene	< 330	330	ug/kg	
2-Chlorophenol	< 330	330	ug/kg	
4-Chlorophenyl phenyl ether	< 330	330	ug/kg	
Chrysene	1,210	330	ug/kg	
Dibenzo(a,h)anthracene	218	90	ug/kg	
Dibenzofuran	< 330	330	ug/kg	
1,2-Dichlorobenzene	< 330	330	ug/kg	
1,3-Dichlorobenzene	< 330	330	ug/kg	
1,4-Dichlorobenzene	< 330	330	ug/kg	
3,3'-Dichlorobenzidine	< 660	660	ug/kg	
2,4-Dichlorophenol	< 330	330	ug/kg	

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Analytical Report

Client: HEPACO, LLC.
Project ID: 1932.1019 PO# 31-100560
Sample ID: Topsoil-Shop
Sample No: 19-5304-001

Date Collected: 08/26/19
Time Collected: 9:00
Date Received: 08/30/19
Date Reported: 09/10/19

Results are reported on a dry weight basis.

Analyte	Result	R.L.	Units	Flags
Semi-Volatile Compounds **Method: 8270C** Analysis Date: 09/06/19		**Preparation Method 3540C** Preparation Date: 09/04/19		
Diethyl phthalate	< 330	330	ug/kg	
2,4-Dimethylphenol	< 330	330	ug/kg	
Dimethyl phthalate	< 330	330	ug/kg	
Di-n-butyl phthalate	< 330	330	ug/kg	
4,6-Dinitro-2-methylphenol	< 1,600	1600	ug/kg	
2,4-Dinitrophenol	< 1,600	1600	ug/kg	
2,4-Dinitrotoluene	< 250	250	ug/kg	
2,6-Dinitrotoluene	< 260	260	ug/kg	
Di-n-octylphthalate	< 330	330	ug/kg	
Fluoranthene	1,710	330	ug/kg	
Fluorene	< 330	330	ug/kg	
Hexachlorobenzene	< 330	330	ug/kg	
Hexachlorobutadiene	< 330	330	ug/kg	
Hexachlorocyclopentadiene	< 330	330	ug/kg	
Hexachloroethane	< 330	330	ug/kg	
Indeno(1,2,3-cd)pyrene	1,050	330	ug/kg	
Isophorone	< 330	330	ug/kg	
2-Methylnaphthalene	< 330	330	ug/kg	
2-Methylphenol	< 330	330	ug/kg	
3 & 4-Methylphenol	< 330	330	ug/kg	
Naphthalene	< 330	330	ug/kg	
2-Nitroaniline	< 1,600	1600	ug/kg	
3-Nitroaniline	< 1,600	1600	ug/kg	
4-Nitroaniline	< 1,600	1600	ug/kg	
Nitrobenzene	< 260	260	ug/kg	
2-Nitrophenol	< 1,600	1600	ug/kg	
4-Nitrophenol	< 1,600	1600	ug/kg	
n-Nitrosodi-n-propylamine	< 90	90	ug/kg	
n-Nitrosodimethylamine	< 330	330	ug/kg	
n-Nitrosodiphenylamine	< 330	330	ug/kg	
Pentachlorophenol	< 330	330	ug/kg	
Phenanthrene	509	330	ug/kg	
Phenol	< 330	330	ug/kg	
Pyrene	1,370	330	ug/kg	
Pyridine	< 330	330	ug/kg	
1,2,4-Trichlorobenzene	< 330	330	ug/kg	

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Analytical Report

Client: HEPACO, LLC.
Project ID: 1932.1019 PO# 31-100560
Sample ID: Topsoil-Shop
Sample No: 19-5304-001

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Results are reported on a dry weight basis.

Analyte	Result	R.L.	Units	Flags
Semi-Volatile Compounds **Method: 8270C** Analysis Date: 09/06/19		**Preparation Method 3540C** Preparation Date: 09/04/19		
2,4,5-Trichlorophenol	< 330	330	ug/kg	
2,4,6-Trichlorophenol	< 330	330	ug/kg	
Pesticides/PCBs **Method: 8081A/8082** Analysis Date: 09/10/19		**Preparation Method 3546** Preparation Date: 09/05/19		
Aldrin	< 8.0	8.0	ug/kg	
Aroclor 1016	< 80.0	80.0	ug/kg	
Aroclor 1221	< 80.0	80.0	ug/kg	
Aroclor 1232	< 80.0	80.0	ug/kg	
Aroclor 1242	< 80.0	80.0	ug/kg	
Aroclor 1248	< 80.0	80.0	ug/kg	
Aroclor 1254	< 160	160	ug/kg	
Aroclor 1260	< 160	160	ug/kg	
alpha-BHC	< 2.0	2.0	ug/kg	
beta-BHC	< 8.0	8.0	ug/kg	
delta-BHC	< 8.0	8.0	ug/kg	
gamma-BHC (Lindane)	< 8.0	8.0	ug/kg	
alpha-Chlordane	< 80.0	80.0	ug/kg	
gamma-Chlordane	< 80.0	80.0	ug/kg	
4,4'-DDD	< 16.0	16.0	ug/kg	
4,4'-DDE	< 16.0	16.0	ug/kg	
4,4'-DDT	< 16.0	16.0	ug/kg	
Dieldrin	< 16.0	16.0	ug/kg	
Endosulfan I	< 8.0	8.0	ug/kg	
Endosulfan II	< 16.0	16.0	ug/kg	
Endosulfan sulfate	< 16.0	16.0	ug/kg	
Endrin	< 16.0	16.0	ug/kg	
Endrin aldehyde	< 16.0	16.0	ug/kg	
Endrin ketone	< 16.0	16.0	ug/kg	
Heptachlor	< 8.0	8.0	ug/kg	
Heptachlor epoxide	< 8.0	8.0	ug/kg	
Methoxychlor	< 80.0	80.0	ug/kg	
Toxaphene	< 160	160	ug/kg	
Total Metals **Method: 6010C** Analysis Date: 09/03/19		**Preparation Method 3050B** Preparation Date: 09/03/19		
Aluminum	9,690	10.0	mg/kg	

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Analytical Report

Client: HEPACO, LLC.
Project ID: 1932.1019 PO# 31-100560
Sample ID: Topsoil-Shop
Sample No: 19-5304-001

Date Collected: 08/26/19
Time Collected: 9:00
Date Received: 08/30/19
Date Reported: 09/10/19

Results are reported on a dry weight basis.

Analyte	Result	R.L.	Units	Flags
Total Metals **Method: 6010C**		**Preparation Method 3050B**		
Analysis Date: 09/03/19		Preparation Date: 09/03/19		
Antimony	< 1.0	1.0	mg/kg	
Arsenic	5.2	1.0	mg/kg	
Barium	124	0.5	mg/kg	
Beryllium	< 0.5	0.5	mg/kg	
Cadmium	< 0.5	0.5	mg/kg	
Calcium	4,750	50	mg/kg	
Chromium	14.0	0.5	mg/kg	
Cobalt	8.1	0.5	mg/kg	
Copper	11.8	0.5	mg/kg	
Iron	15,000	5.0	mg/kg	
Lead	13.1	0.5	mg/kg	
Magnesium	3,720	50	mg/kg	
Manganese	758	0.5	mg/kg	
Nickel	12.6	0.5	mg/kg	
Potassium	988	50	mg/kg	
Selenium	< 1.0	1.0	mg/kg	
Silver	0.5	0.2	mg/kg	
Sodium	62	50	mg/kg	
Thallium	< 1.0	1.0	mg/kg	
Vanadium	28.2	1.0	mg/kg	
Zinc	42.0	1.0	mg/kg	
Total Mercury **Method: 7471B**				
Analysis Date: 09/03/19				
Mercury	< 0.05	0.05	mg/kg	
Cyanide, Total **Method: 4500CN,E 1999**				
Analysis Date: 09/04/19				
Cyanide, Total	0.22	0.10	mg/kg	N

CHAIN OF CUSTODY RECORD

First Environmental Laboratories, Inc.

First Environmental Laboratories
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Naperville, Illinois 60563
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E-mail: firstinfo@firstenv.com • www.firstenv.com
IEPA Certification #100292

Company Name: HEPACO LLC
Street Address: 8184 STARWOOD Drive
City: Loves PARK State: IL Zip: 61111
Phone: 815-885-4840 e-mail: jlonas@hepaco.com
Send Report To: JEFF LONAS
Sampled By: Jeff Lonas

Project I.D.: 1932.1019
P.O. #: 31-100560

Matrix Codes: S = Soil W = Water O = Other

Analyses

Date/Time Taken	Sample Description	Matrix	SEE ATT LIST								Hold – Do Not Analyze	Comments	Lab I.D.
8-26-19- 9:00	Top soil - Shop	S.	X										19-J304-001

FOR LAB USE ONLY:

Cooler Temperature: 0.1-6ºC Yes__ No.__ _____ºC
Received within 6 hrs. of collection:_____
Ice Present: Yes__ No__

Sample Refrigerated: Yes~~X~~ No__
Refrigerator Temperature: 4 ºC
5035 Vials Frozen: Yes__ No__
Freezer Temperature:_____ºC

Program: ☐ TACO/SRP ☐ CCDD ☐ NPDES ☐ LUST ☐ SDWA

Notes and Special Instructions: _____

Relinquished By: JJ Lonas Date/Time 8/30/19 10:57 Received By: [signature] Date/Time 8/30/19 10:57
Relinquished By: _____ Date/Time _____ Received By: _____ Date/Time _____